Final 2020 Baseline Monitoring Report Red Devil Mine, Alaska

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Prepared for:

U.S. DEPARTMENT OF INTERIOR BUREAU OF LAND MANAGEMENT Anchorage Field Office 4700 BLM Road Anchorage, Alaska 99507

Prepared by:

ECOLOGY AND ENVIRONMENT, INC., MEMBER OF WSP 720 3rd Avenue Seattle, Washington 98104-1816

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BLM U.S. Department of the Interior Bureau of Land Management

cfs cubic feet per second

COCs Contaminants of concern

E & E Ecology and Environment, Inc., member of WSP

IDW investigation-derived waste

MPA Main Processing Area

QC quality control

RDM Red Devil Mine

RI Remedial Investigation

SMA Surface mined area

TAL target analyte list

TDS total dissolved solids

TSS total suspended solids

Work Plan Final Work Plan, Groundwater and Surface Water Baseline Monitoring, Red

Devil Mine, Alaska

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1

Introduction

This report presents the results of the spring and fall 2020 baseline groundwater and surface water monitoring effort at the Red Devil Mine (RDM) site (see Figures 1-1 and 1-2). The RDM is an abandoned mercury mine and ore processing facility located on public lands managed by the Bureau of Land Management (BLM) in southwest Alaska. Historical mining activities included underground and surface mining and ore processing. Onsite ore processing included crushing, retorting/furnacing, milling, and flotation. Ecology and Environment, Inc., member of WSP (hereafter referred to as E & E) prepared this baseline monitoring report on behalf of the BLM under Delivery Order Number 140L6318F0016 and General Services Administration Contract Number GS-10F-0160J.

This report summarizes the field activities, procedures, and results for baseline monitoring of groundwater and surface water performed at RDM during 2020.

1.1 Purpose and Objectives

The purpose of the baseline monitoring is to collect surface water and groundwater samples, as well as streamflow and groundwater elevation data to inform remedial actions at the RDM. This baseline monitoring expands upon work that began during the 2011–2014 Remedial Investigation (RI) and continued through the 2015–2018 RI Supplement and contemporaneous baseline monitoring for groundwater and surface water. The objectives of the baseline monitoring are to:

- Define baseline conditions prior to remedial action;
- Characterize the seasonal variability in groundwater and surface water hydrology and quality; and
- Characterize the long-term (multiple-year) variability in groundwater and surface water hydrology and quality.

1.2 Project Location and Setting

The RDM site is located approximately 250 air miles west and 1,500 marine/river barge miles from Anchorage, Alaska. Located on the southwest bank of the Kuskokwim River, approximately 2 miles southeast of the village of Red Devil, the site is 75 air miles northeast of Aniak, the largest village in the region, and approximately 8 miles northwest of the village of Sleetmute. Approximately 15 villages are located on the 260 mile stretch downstream of Red Devil on the Kuskokwim River. The legal description for the RDM site is Township 19 North,



Range 44 West, Southeast Quarter of Section 6, Sleetmute D-4 Quadrangle, Seward Meridian. The RDM site's approximate coordinates are 61° 45' 38.1" north latitude and 157° 18' 42.7" west longitude (North American Datum 1927).

The RDM site is in a remote location, and access to the site is available by boat or barge on the Kuskokwim River or by all terrain vehicle from an airstrip at the nearby village of Red Devil.

2

Field Activities and Procedures

This chapter presents and discusses the results of two field events. The events were designed to capture the hydrologic conditions present during the spring and fall seasons at the site. The spring 2020 event was originally targeted for the period shortly after snow receded from the Red Devil Mine site and the seasonal ice on the Kuskokwim River broke up. Onset of the COVID-19 pandemic delayed mobilization for the spring sampling event for three weeks while the BLM and E&E worked out COVID safety procedures for the field crew and coordinated with the residents of Red Devil Village on lodging and site access using appropriate social distancing procedures. The COVID safety procedures developed for the field crew and to limit exposure to community residents were exercised during both the spring and fall sampling events.

The spring 2020 event was conducted from June 15 through June 23, 2020. The fall event was targeted to begin as late in year as possible but before the first snowfall and before limited daylight and colder temperatures would adversely affect field productivity. The fall field event occurred from September 1 to September 9, 2020.

In general, activities performed for each monitoring event include measurement of groundwater elevations, surface water discharge measurements, surface water sampling, and low-flow groundwater sampling. Specific activities for each field event are further described in Sections 2.1 through 2.2.

Photographs of the site taken during both the spring and fall 2020 field events are included as Appendix A. A field logbook was maintained throughout each sampling event. Pertinent information about the sampling locations and notes regarding flow measurements were recorded in the field logbook (see Appendix B). Additionally, field data sheets were completed using an electronic tablet and contain sample information and water quality measurements taken during purging prior to groundwater sampling.

Field activities were performed in accordance with the *Final Work Plan, Ground-water and Surface Water Baseline Monitoring, Red Devil Mine, Alaska* (Work Plan) (E & E 2019a), and the addendum to the 2019 Work Plan (E & E, email communication, dated August 29, 2020).



2.1 Groundwater Monitoring

2.1.1 Spring 2020 Baseline Monitoring

Groundwater monitoring during the spring 2020 baseline monitoring event consisted of:

- Measuring static water levels at all accessible monitoring wells at the RDM site in a single day in order to collect a "snapshot" of groundwater levels;
- Downloading of continuous water level data from pressure transducers and data-loggers installed in a network of monitoring wells; and
- Collecting groundwater samples from 24 existing monitoring wells.

The groundwater static water levels were measured on June 16, 2020. Static water level measurements were augmented with the continuous water-level measurements collected from selected wells using pressure transducers and data-loggers between the fall of 2017 and spring 2020, as described in the Work Plan (E & E 2019). Pressure transducer data recorded between September 2019 and June 2020 were downloaded during the spring 2020 field event, and the transducers were then reinstalled in wells MW50, MW51, MW53, MW54, MW56, MW57, and MW58.

Table 2-1 provides a summary of the groundwater samples collected during the spring 2020 field event. Monitoring locations are illustrated in Figure 2-1. Groundwater samples were collected for laboratory analysis of the following using the methods identified in Table 2-1:

- Total target analyte list (TAL) metals
- Total low-level mercury
- Dissolved low-level mercury
- Total suspended solids (TSS)
- Inorganic ions
- Carbonate alkalinity as calcium carbonate (CaCO₃)
- Nitrate/nitrite as nitrogen (N)

Field water quality measurements for pH, temperature, specific conductance, oxidation-reduction potential, dissolved oxygen, and turbidity were collected at each monitoring well prior to sample collection.

Groundwater samples were collected using a low-flow sampling technique with a maximum flow rate of 0.5 liters per minute following sampling methodologies described in the Work Plan (E & E 2019a). The type of pump used to perform the low-flow purging and sampling at each well is identified in Table 2-1.



2.1.2 Fall 2020 Baseline Monitoring

Groundwater monitoring during the fall 2020 baseline monitoring event consisted of:

- Installing new well caps for dedicated bladder pumps into 14 monitoring wells;
- Measuring static water levels at all accessible monitoring wells at the RDM site in a single day;
- Downloading continuous water level data from pressure transducers and dataloggers installed in a network of monitoring wells; and
- Collecting groundwater samples from 24 existing monitoring wells.

The groundwater static water levels were measured on September 1, 2020. Static water-level measurements were augmented with the continuous water level measurements collected using pressure transducers between the spring of 2020 and fall 2020, as described in the Work Plan (E & E 2019a). Pressure transducer data recorded between June 2020 and September 2020 were downloaded during the fall 2020 field event, and the transducers were then reinstalled in wells MW50, MW51, MW53, MW54, MW56, MW57, and MW58.

Table 2-1 provides a summary of the groundwater samples collected during the fall 2019 field event. Monitoring locations are illustrated in Figure 2-1. Groundwater samples were collected for laboratory analysis of the following using the methods identified in Table 2-1:

- Total TAL inorganic elements
- Total low-level mercury
- Dissolved low-level mercury
- Inorganic ions
- Nitrate/nitrite as N
- Carbonate alkalinity as CaCO₃
- TSS

Field water quality measurements for pH, temperature, specific conductance, oxidation-reduction potential, dissolved oxygen, and turbidity were collected at each monitoring well prior to sample collection.

Groundwater samples were collected using a low-flow sampling technique with a maximum flow rate of 0.5 liters per minute following sampling methodologies described in the Work Plan (E & E 2019a).



2.2 Red Devil Creek Surface Water Monitoring

During the spring and fall 2020 baseline monitoring events, surface water monitoring was conducted at five locations along Red Devil Creek between the creek's mouth at the Kuskokwim River and the reservoir south of the Main Processing Area (MPA). Surface water monitoring locations are illustrated on Figure 2-1. Table 2-2 provides a summary of the samples collected. Surface monitoring consisted of measuring stream flow and collecting surface water samples. Surface water discharge was measured using the mid-section method at creek monitoring locations following the mid-section methodology described in the Work Plan (E & E 2019a). At the seep (RD05), discharge was measured using the timed fill method described in the Work Plan (E & E 2019a).

Red Devil Creek surface water samples were collected for laboratory analysis of the following using the methods identified in Table 2-2:

- Total TAL metals
- Dissolved TAL metals
- Total low-level mercury
- Dissolved low-level mercury
- Total organic carbon
- TSS
- TDS
- Inorganic ions
- Carbonate alkalinity as CaCO₃
- Nitrate/nitrite as N

Field water quality measurements for pH, temperature, specific conductance, oxidation-reduction potential, dissolved oxygen, and turbidity were collected at each sample station.

Surface water samples were collected using a battery-operated peristaltic pump outfitted with certified-clean, dedicated silicone tubing following sampling methodologies described in the Work Plan (E & E 2019a).

2.3 Sample Handling

Sample handling (e.g., chain-of-custody and field documentation, etc.) during the spring and fall 2020 baseline monitoring events was conducted as described in the Work Plan (E & E 2019a).

2.4 Quality Control Samples

Field quality control (QC) samples were collected for all matrices and analytes following the requirements specified in the Work Plan (E & E 2019a).



2.5 Investigation-Derived Waste Management

Investigation-derived waste (IDW) generated during the spring and fall 2020 baseline monitoring events included the following:

- Monitoring well purge water;
- Used dedicated sampling equipment, personal protective equipment, and paper towels; and
- Decontamination fluids generated during groundwater sampling.

IDW was managed in accordance with the Work Plan (E & E 2019a).

Table 2-1 Groundwater Sample Collection

	dwater Sample Co		Sam	ole Analyses and Met				
Monitoring Well ID	Sampling Method	Total TAL Metals	Total Low- Level Hg	Dissolved Low- Level Hg	Total Suspended Solids	Inorganic lons	Carbonate Alkalinity as CaCO3	Nitrate Nitrite as N
	Metriou	EPA 6010C/6020A	EPA 1631E	EPA 1631E	SM 2540D	MCAWW 300.0	SM 2320B	MCAWW 353.2
MW10	Bladder	•	•	•	•	•	•	•
MW16	Peristaltic	•	•	•	•	•	•	•
MW17	Peristaltic	•	•	•	•	•	•	•
MW27	Bladder	•	•	•	•	•	•	•
MW28	Bladder	•	•	•	•	•	•	•
MW06	Peristaltic	•	•	•	•	•	•	•
MW40	Bladder	•	•	•	•	•	•	•
MW42	Bladder	•	•	•	•	•	•	•
MW43	Bladder	•	•	•	•	•	•	•
MW44	Bladder	•	•	•	•	•	•	•
MW45	Bladder	•	•	•	•	•	•	•
MW46	Bladder	•	•	•	•	•	•	•
MW47	Bladder	•	•	•	•	•	•	•
MW48	Peristaltic	•	•	•	•	•	•	•
MW50	Bladder	•	•	•	•	•	•	•
MW51	Bladder	•	•	•	•	•	•	•
MW52	Bladder	•	•	•	•	•	•	•
MW53	Bladder	•	•	•	•	•	•	•
MW54	Bladder	•	•	•	•	•	•	•
MW55	Peristaltic	•	•	•	•	•	•	•
MW56	Bladder	•	•	•	•	•	•	•
MW57	Bladder	•	•	•	•	•	•	•
MW58	Bladder	•	•	•	•	•	•	•
MW59	Bladder	•	•	•	•	•	•	•

Key:

CaCO3 = calcium carbonate

EPA = U.S. Environmental Protection Agency

Hg = mercury
MCAWW = Methods for Chemical Analysis of Water and Wastes

N = nitrogen

TAL = Target Analyte List

Table 2-2 Surface Water Sample Collection

			Sample Analyses and Methods									
Sample Location ID	Location Description	Total TAL Metals	Dissolved TAL Metals	Total Low- Level Hg	Dissolved Low-Level Hg	Total Organic Carbon	Total Suspended Solids	Total Dissolved Solids	Inorganic Ions	Carbonate Alkalinity as CaCO3	Nitrate Nitrite as N	
		EPA 6010C/6020A	EPA 6010C/6020A	EPA 1631E	EPA 1631E	SW846 9060	SM 2540D	SM 2540C	MCAWW 300.0	SM 2320B	MCAWW 353.2	
RD10SW	Red Devil Creek, downstream of the reservoir, upstream of NTCRA	•	•	•	•	•	•	•	•	•	•	
RD15SW	Red Devil Creek, new station immediately downstream of the newly aligned section (post-NTCRA) of Red Devil Creek, near former baseline monitoring station RD13SW	•	•	•	•	•	•	•	•	•	•	
RD05SW	Seep on left bank of Red Devil Creek	•	•	•	•	•	•	•	•	•	•	
RD06SW	Red Devil Creek, near Settling Pond #3	•	•	•	•	•	•	•	•	•	•	
RD08SW	Red Devil Creek, near confluence of Red Devil Creek and Kuskokwim River, downstream of sediment trap constructed during NTCRA	•	•	•	•	•	•	•	•	•	•	

Key:

CaCO3 = calcium carbonate

EPA = Environmental Protection Agency

Hg = Mercury

MCAWW = Methods for Chemical Analysis of Water and Wastes

N = nitrogen

NTCRA = non-time-critical removal action

TAL = Target Analyte List



3

Baseline Monitoring Results

This section presents results of the 2020 baseline groundwater and surface water monitoring events.

3.1 Groundwater Elevation and Surface Water Discharge Monitoring

3.1.1 Spring 2020

Depth to groundwater measurements and calculated groundwater elevations for wells monitored during the spring 2020 baseline monitoring event are presented in Table 3-1. Estimated surface water discharge calculations for Red Devil Creek surface water stations monitored during the spring 2020 baseline monitoring event are presented in Table 3-2. Based on static water elevations, stream elevations, and discharge measurements along Red Devil Creek, a groundwater potentiometric surface and surface water discharge map for the spring 2020 baseline monitoring was generated and is presented as Figure 3-1. Pressure transducer data-logger files containing depth of submersion time series data were corrected for barometric pressure and converted to groundwater elevations. The resulting groundwater elevations time series plots are presented as Fig 3-3. Observed groundwater elevations and Red Devil Creek stream discharges for spring 2020 are notably lower than previous spring monitoring events, possibly due to a later (mid-June) mobilization.

3.1.2 Fall 2020

Depth to groundwater measurements and calculated groundwater elevations for wells monitored during the fall 2020 baseline monitoring event are presented in Table 3-1. Estimated surface water discharge calculations for Red Devil Creek surface water stations monitored during the fall 2020 baseline monitoring event are presented in Table 3-2. Based on static water elevations, stream elevations, and discharge measurements along Red Devil Creek, a groundwater potentiometric surface and surface water discharge map for the fall 2020 baseline monitoring was generated and is presented as Figure 3-2. Pressure transducer data-logger files containing depth of submersion time series data were corrected for barometric pressure and converted to groundwater elevations. The resulting groundwater elevation time series plots are presented as Fig 3-3.



3.2 Spring 2020 Groundwater and Surface Water Sampling

3.2.1 Groundwater

Analytical results of groundwater sampling conducted during the spring 2020 baseline monitoring event are presented in Table 3-3. Data quality assurance review memoranda are provided in Appendix C. Maps of all sampling locations with corresponding analytical results for total antimony, total arsenic, and total and dissolved mercury are presented as Figures 3-4 through 3-6.

The following issues with data usability were noted:

■ Analysis of inorganic ions was requested but not performed by the laboratory before the end of the sample holding time. Refer to the data quality assurance memo (see Appendix C) for more details.

3.2.2 Surface Water

Analytical results of surface water sampling conducted during the spring 2020 baseline monitoring event are presented in Table 3-4. Data quality assurance review memoranda are provided in Appendix C. Maps of all sampling locations with corresponding analytical results for total and dissolved antimony, arsenic, and mercury are presented as Figures 3-4 through 3-6.

3.3 Fall 2020 Groundwater and Surface Water Sampling 3.3.1 Groundwater

Analytical results of groundwater sampling conducted during the fall 2020 baseline monitoring event are presented in Table 3-5. Data quality assurance review memoranda are provided in Appendix C.

Maps of all sampling locations with corresponding analytical results for total antimony, total arsenic, and total and dissolved mercury are presented as Figures 3-7 through 3-9.

3.3.2 Surface Water

Analytical results of surface water sampling conducted during the fall 2020 base-line monitoring event are presented in Table 3-6. Data quality assurance review memoranda are provided in Appendix C. Maps of all sampling locations with corresponding analytical results for total and dissolved antimony, arsenic, and mercury are presented as Figures 3-7 through 3-9.

Table 3-1	Well Construction and	Groundwater Denth	Information
i abie 3-1	well Construction and t	Groundwaler Debin	mnormation

Table 3-1 W	ell Construct	ion and Groundw	ater Depth Info	rmation				Static	: Water Level		
Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Depth (feet below TOC)	Date	Time	Ground Water Elevation (feet NAVD88)
MW01	B01	29.5	19.0 - 29.0	254.51	257.51	17.8 - TD		21.72	8/14/2000	NR	235.79
MW01	B01	29.5	19.0 - 29.0	254.51	257.51	17.8 - TD		19.87	9/5/2007	13:15	237.64
MW01 MW01	B01 B01	29.5 29.5	19.0 - 29.0 19.0 - 29.0	254.51 254.51	257.51 257.51	17.8 - TD 17.8 - TD		22.16 19.62	9/18/2008 6/19/2009	13:28 NR	235.35 237.89
MW01	B01	29.5	19.0 - 29.0	254.51	257.51	17.8 - TD		22.27	10/6/2009	17:30	235.24
MW01	B01	29.5	19.0 - 29.0	254.51	257.51	17.8 - TD		20.04	9/20/2010	18:18	237.47
MW01 MW01	B01 B01	29.5 29.5	19.0 - 29.0 19.0 - 29.0	254.51 254.51	257.51 257.51	17.8 - TD 17.8 - TD		19.46 19.55	8/24/2011 9/1/2011	16:38 16:03	238.05 237.96
MW01	B01	29.5	19.0 - 29.0	254.51	257.51	17.8 - TD		17.56	5/26/2012	14:32	239.95
MW01	B01	29.5	19.0 - 29.0	254.51	257.51	17.8 - TD		18.62	9/9/2012	17:05	238.89
MW01 MW01	B01 B01	29.5 29.5	19.0 - 29.0 19.0 - 29.0	254.51 254.51	257.51 257.51	17.8 - TD 17.8 - TD		19.43 20.80	6/17/2015 8/12/2015	13:03 12:15	238.08 236.71
MW01	B01	29.5	19.0 - 29.0	254.51	257.51	17.8 - TD		21.03	9/2/2015	9:50	236.48
MW01	B01	29.5	19.0 - 29.0	254.51	257.51	17.8 - TD	29.82	20.36	9/10/2015	NR	237.15
MW01 MW01	B01 B01	29.5 29.5	19.0 - 29.1 19.0 - 29.1	254.51 254.51	257.51 257.51	17.8 - TD 17.8 - TD	29.80 29.76	18.26 19.46	9/28/2016 5/26/2017	13:05 1202	239.25 238.05
MW01	B01	29.5	19.0 - 29.1	254.51	257.51	17.8 - TD	29.76	18.56	9/26/2017	1332	238.95
MW01	B01	29.5	19.0 - 29.1	254.51	257.51	17.8 - TD	NR	17.65	5/18/2018	13:36	239.86
MW01 MW01	B01 B01	29.5 29.5	19.0 - 29.1 19.0 - 29.1	254.51 254.51	257.51 257.51	17.8 - TD 17.8 - TD	NR NR	17.43 21.83	5/18/2019 9/10/2019	13:44 1242	240.08 235.68
MW01	B01	29.5	19.0 - 29.1	254.51	257.51	17.8 - TD	NR	21.50	6/17/2020	14:20	236.01
MW01	B01	29.5	19.0 - 29.1	254.51	257.51	17.8 - TD	NR	22.07	9/2/2020	12:13	235.44
MW03 MW03	B03 B03	25.5 25.5	15.0 - 25.0 15.0 - 25.0	228.37 228.37	230.77 230.77	19.0 - TD 19.0 - TD		22.28 20.68	8/14/2000 9/5/2007	NR 14:40	208.49 210.09
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD		22.57	9/18/2008	14:11	208.20
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD		19.51	6/19/2009	NR 42-20	211.26
MW03 MW03	B03 B03	25.5 25.5	15.0 - 25.0 15.0 - 25.0	228.37 228.37	230.77 230.77	19.0 - TD 19.0 - TD		23.01 20.95	10/7/2009 9/20/2010	13:20 19:50	207.76 209.82
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD 19.0 - TD		19.44	8/26/2011	10:18	211.33
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD		19.96	9/1/2011	15:41	210.81
MW03 MW03	B03 B03	25.5 25.5	15.0 - 25.0 15.0 - 25.0	228.37 228.37	230.77 230.77	19.0 - TD 19.0 - TD		15.47 17.24	5/26/2012 9/9/2012	15:17 17:10	215.30 213.53
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD 19.0 - TD		19.74	6/17/2015	10:54	213.53
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD		21.83	8/12/2015	12:33	208.94
MW03 MW03	B03 B03	25.5 25.5	15.0 - 25.0 15.0 - 25.0	228.37 228.37	230.77 230.77	19.0 - TD 19.0 - TD	27.98	22.20 21.92	9/2/2015 9/10/2015	9:45 NR	208.57 208.85
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	27.85	16.77	9/28/2016	13:10	214.00
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	NR	22.60	5/26/2017	11:21	208.17
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	27.75 NR	18.96 15.64	9/26/2017 5/18/2018	1255 13:51	211.81
MW03 MW03	B03 B03	25.5 25.5	15.0 - 25.0 15.0 - 25.0	228.37 228.37	230.77 230.77	19.0 - TD 19.0 - TD	NR NR	14.78	5/18/2019	14:09	215.13 215.99
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	NR	22.79	9/10/2019	1340	207.98
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	NR	20.14	6/17/2020	13:30	210.63
MW03 MW04	B03 B04	25.5 30.5	15.0 - 25.0 20.0 - 30.0	228.37 239.92	230.77 242.12	19.0 - TD 25.3 - TD	NR	22.65 27.77	9/2/2020 8/14/2000	13:11 NR	208.12 214.35
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD		26.78	9/5/2007	12:25	215.34
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD		26.82	9/18/2008	12:32	215.30
MW04 MW04	B04 B04	30.5 30.5	20.0 - 30.0 20.0 - 30.0	239.92 239.92	242.12 242.12	25.3 - TD 25.3 - TD		25.43 27.77	6/19/2009 10/6/2009	NR 18:55	216.69 214.35
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD		26.79	9/20/2010	16:09	215.33
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD		25.24	8/22/2011	16:02	216.88
MW04 MW04	B04 B04	30.5 30.5	20.0 - 30.0 20.0 - 30.0	239.92 239.92	242.12 242.12	25.3 - TD 25.3 - TD		25.99 21.72	9/1/2011 5/26/2012	15:00 16:47	216.13 220.40
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD		23.72	9/10/2012	14:15	218.40
MW04	B04 B04	30.5 30.5	20.0 - 30.0	239.92 239.92	242.12 242.12	25.3 - TD 25.3 - TD		26.95 NR	6/17/2015 8/12/2015	15:13 NR	215.17
MW04 MW04	B04	30.5	20.0 - 30.0 20.0 - 30.0	239.92	242.12	25.3 - TD		28.61	9/2/2015	11:40	213.51
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD	33.11	28.32	9/10/2015	NR	213.80
MW04 MW04	B04 B04	30.5 30.5	20.0 - 30.0 20.0 - 30.0	239.92 239.92	242.12 242.12	25.3 - TD 25.3 - TD	33.02	23.81	9/28/2016 5/26/2017	12:42	218.31 213.86
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD	NR 32.83	28.26 24.86	9/26/2017	12:11 1729	217.26
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD	NR	22.22	5/18/2018	12:59	219.90
MW04 MW04	B04 B04	30.5 30.5	20.0 - 30.0 20.0 - 30.0	239.92 239.92	242.12 242.12	25.3 - TD 25.3 - TD	NR NR	20.76 28.64	5/18/2019 9/10/2019	16:12 1140	221.36 213.48
MW04	B05	31.5	20.0 - 30.0	239.92	242.12	25.3 - TD	NR	27.12	6/17/2020	1140	215.46
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD	NR	28.9	9/2/2020	17:25	213.22
MW06 MW06	B06 B06	23.5 23.5	13.0 - 23.0 13.0 - 23.0	214.99 214.99	217.49 217.49	20.0 - TD 20.0 - TD		19.29 18.63	8/14/2000 9/5/2007	NR 15:30	198.20 198.86
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD		19.08	9/18/2007	11:35	198.41
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD		17.90	6/19/2009	NR	199.59
MW06 MW06	B06 B06	23.5 23.5	13.0 - 23.0 13.0 - 23.0	214.99 214.99	217.49 217.49	20.0 - TD 20.0 - TD		19.29 19.03	10/7/2009 9/20/2010	17:25 13:22	198.20 198.46
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD		18.78	8/24/2011	14:56	198.71
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD		18.70	9/1/2011	15:09	198.79
MW06 MW06	B06 B06	23.5 23.5	13.0 - 23.0 13.0 - 23.0	214.99 214.99	217.49 217.49	20.0 - TD 20.0 - TD		16.25 18.29	5/26/2012 9/9/2012	16:02 11:45	201.24 199.20
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD		18.24	6/17/2015	14:25	199.25
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD		19.17	8/12/2015	11:03	198.32
MW06 MW06	B06 B06	23.5 23.5	13.0 - 23.0 13.0 - 23.0	214.99 214.99	217.49 217.49	20.0 - TD 20.0 - TD	26.19	19.20 19.18	9/2/2015 9/10/2015	11:15 NR	198.29 198.31
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD	26.19	17.64	9/28/2016	13:38	199.85
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD	26.12	19.05	5/26/2017	12:52	198.44
MW06 MW06	B06 B06	23.5 23.5	13.0 - 23.0 13.0 - 23.0	214.99 214.99	217.49 217.49	20.0 - TD 20.0 - TD	26.12 NR	18.16 16.07	9/26/2017 5/18/2018	1644 13:21	199.33 201.42
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD	NR	15.75	5/18/2019	13:47	201.74
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD	NR	19.62	9/10/2019	1218	197.87
MW06 MW06	B06 B06	23.5 23.5	13.0 - 23.0 13.0 - 23.0	214.99 214.99	217.49 217.49	20.0 - TD 20.0 - TD	NR NR	18.01 19.57	6/17/2020 9/2/2020	16:21 17:53	199.48 197.92
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	INIX	19.57 Dry	8/14/2000	NR	Dry (Water Elevation <257.4 feet bgs)
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD		20.42	9/5/2007	14:00	260.47
MW07 MW07	B07 B07	21.5 21.5	11.0 - 21.0 11.0 - 21.0	278.39 278.39	280.89 280.89	14.8 - TD 14.8 - TD		Dry 20.10	9/18/2008 6/19/2009	NR NR	Dry (Water Elevation <257.4 feet bgs) 260.79
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD 14.8 - TD		20.10 Dry	10/7/2009	NR NR	Dry (Water Elevation <257.4 feet bgs)
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD		20.40	9/21/2010	10:20	260.49
MW07 MW07	B07 B07	21.5 21.5	11.0 - 21.0 11.0 - 21.0	278.39 278.39	280.89 280.89	14.8 - TD 14.8 - TD		19.51 19.97	8/26/2011 9/1/2011	9:12 16:14	261.38 260.92
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD		19.97	5/26/2012	13:36	260.92
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Table 3-1	Well Construction and Groundwater Depth Information

Table 3-1 W	ell Construct	ion and Groundw	ater Depth Info	rmation				Static	: Water Level		
Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Depth (feet below TOC)	Date	Time	Ground Water Elevation (feet NAVD88)
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD		20.57	9/9/2012	16:45	260.32
MW07 MW07	B07 B07	21.5 21.5	11.0 - 21.0 11.0 - 21.0	278.39 278.39	280.89 280.89	14.8 - TD 14.8 - TD		21.10	6/17/2015 8/12/2015	12:25 11:54	259.79 258.92
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD		21.97 22.36	9/2/2015	10:50	258.53
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	23.67	22.41	9/10/2015	NR	258.48
MW07 MW07	B07 B07	21.5 21.5	11.0 - 21.0 11.0 - 21.0	278.39 278.39	280.89 280.89	14.8 - TD 14.8 - TD	23.70	20.40	9/28/2016	12:40	260.49 257.72
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	NR 23.47	23.17 20.13	5/26/2017 9/26/2017	13:23 1444	257.72
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	NR	20.02	5/18/2018	13:51	260.87
MW07 MW07	B07 B07	21.5 21.5	11.0 - 21.0 11.0 - 21.0	278.39 278.39	280.89 280.89	14.8 - TD 14.8 - TD	NR NR	16.82 23.14	5/18/2019 9/10/2019	12:55 1414	264.07 257.75
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	NR	20.66	6/17/2020	15:38	260.23
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	NR	23.14	9/2/2020	12:59	257.75
MW08 MW08	11MP01SB 11MP01SB	16.0 16.0	5.0 - 15.0 5.0 - 15.0	328.92 328.92	331.32 331.32	2.5 - 4.0, 10.5 - TD 2.5 - 4.0, 10.5 - TD		13.70 13.65	8/30/2011 9/1/2011	9:21 16:28	317.62 317.67
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD		11.64	5/26/2012	13:23	319.68
MW08	11MP01SB 11MP01SB	16.0 16.0	5.0 - 15.0	328.92	331.32 331.32	2.5 - 4.0, 10.5 - TD		12.74	9/9/2012 6/17/2015	16:10	318.58 317.78
MW08 MW08	11MP01SB	16.0	5.0 - 15.0 5.0 - 15.0	328.92 328.92	331.32	2.5 - 4.0, 10.5 - TD 2.5 - 4.0, 10.5 - TD		13.54 14.87	8/12/2015	12:41 11:58	317.78
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD		15.04	9/2/2015	10:35	316.28
80WM	11MP01SB 11MP01SB	16.0 16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD	17.61	14.89	9/10/2015	NR	316.43 318.33
MW08 MW08	11MP01SB	16.0	5.0 - 15.0 5.0 - 15.0	328.92 328.92	331.32 331.32	2.5 - 4.0, 10.5 - TD 2.5 - 4.0, 10.5 - TD	17.68 17.63	12.99 13.89	9/28/2016 5/26/2017	14:32 13:07	317.43
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD	17.63	12.95	9/26/2017	1534	318.37
MW08 MW08	11MP01SB 11MP01SB	16.0 16.0	5.0 - 15.0 5.0 - 15.0	328.92 328.92	331.32 331.32	2.5 - 4.0, 10.5 - TD	NR NR	11.60 11.02	5/18/2018 5/18/2019	12:56 13:03	319.72 320.30
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD 2.5 - 4.0, 10.5 - TD	NR NR	15.4	9/10/2019	1406	320.30
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD	NR	14.3	6/17/2020	16:04	317.02
MW08 MW09	11MP01SB 11MP17SB	16.0 31.0	5.0 - 15.0 20.0 - 30.0	328.92 274.88	331.32 277.28	2.5 - 4.0, 10.5 - TD 14.0 - 16.0, 31.0 - TD	NR	15.4 >31.56	9/2/2020 8/29/2011	12:43 18:21	315.92
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD		28.11	9/1/2011	16:43	249.17
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD		26.67	5/26/2012	14:04	250.61
MW09 MW09	11MP17SB 11MP17SB	31.0 31.0	20.0 - 30.0 20.0 - 30.0	274.88 274.88	277.28 277.28	14.0 - 16.0, 31.0 - TD 14.0 - 16.0, 31.0 - TD		27.88 27.81	9/9/2012 9/11/2012	15:30 11:20	249.40 249.47
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD		27.60	6/17/2015	11:31	249.47
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD		27.93	8/12/2015	12:04	249.35
MW09 MW09	11MP17SB 11MP17SB	31.0 31.0	20.0 - 30.0 20.0 - 30.0	274.88 274.88	277.28 277.28	14.0 - 16.0, 31.0 - TD 14.0 - 16.0, 31.0 - TD	34.72	28.30 29.38	9/2/2015 9/10/2015	10:00 NR	248.98 247.90
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD	34.63	26.05	9/28/2016	NR	251.23
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD	34.62	30.22	5/26/2017	12:40	247.06
MW09 MW09	11MP17SB 11MP17SB	31.0 31.0	20.0 - 30.0 20.0 - 30.0	274.88 274.88	277.28 277.28	14.0 - 16.0, 31.0 - TD 14.0 - 16.0, 31.0 - TD	34.62 NR	26.90 22.20	9/26/2017 5/18/2018	1356 13:21	250.38 255.08
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD	NR	24.00	5/18/2019	13:34	253.28
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD	NR	31.95	9/10/2019	1300	245.33
MW09 MW09	11MP17SB 11MP17SB	31.0 31.0	20.0 - 30.0 20.0 - 30.0	274.88 274.88	277.28 277.28	14.0 - 16.0, 31.0 - TD 14.0 - 16.0, 31.0 - TD	NR NR	27.33 27.26	6/17/2020 9/2/2020	15:39 12:29	249.95 250.02
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	Tut	30.60	8/29/2011	16:15	245.61
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD		29.17	9/1/2011	16:38	247.04
MW10 MW10	11MP14SB 11MP14SB	61.0 61.0	50.0 - 60.0 50.0 - 60.0	274.31 274.31	276.21 276.21	48.0 - TD 48.0 - TD		25.62 26.39	5/26/2012 9/9/2012	14:14 15:45	250.59 249.82
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD		26.88	9/10/2012	11:35	249.33
MW10	11MP14SB 11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD		28.98 32.90	6/17/2015	11:37	247.23 243.31
MW10 MW10	11MP14SB	61.0 61.0	50.0 - 60.0 50.0 - 60.0	274.31 274.31	276.21 276.21	48.0 - TD 48.0 - TD		33.52	8/12/2015 9/2/2015	12:09 10:25	243.31
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	63.54	31.02	9/10/2015	NR	245.19
MW10 MW10	11MP14SB 11MP14SB	61.0 61.0	50.0 - 60.0 50.0 - 60.0	274.31 274.31	276.21 276.21	48.0 - TD 48.0 - TD	63.97 63.53	25.92 30.19	9/28/2016 5/26/2017	NR 12:46	250.29 246.02
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	63.53	26.03	9/26/2017	1347	250.18
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	NR	24.46	5/18/2018	13:28	251.75
MW10 MW10	11MP14SB 11MP14SB	61.0 61.0	50.0 - 60.0 50.0 - 60.0	274.31 274.31	276.21 276.21	48.0 - TD 48.0 - TD	NR NR	23.30 31.46	5/18/2019 9/10/2019	13:43 1253	252.91 244.75
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	NR	21.65	6/17/2020	14:25	254.56
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	NR	32.56	9/2/2020	12:23	243.65
MW11 MW11	11MP12SB 11MP12SB	23.0 23.0	12.0 - 22.0 12.0 - 22.0	268.70 268.70	271.30 271.30	dry dry		Dry Dry	8/29/2011 9/1/2011	12:00 16:34	Dry (Water Elevation <246.7 feet bgs) Dry (Water Elevation <246.7 feet bgs)
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	dry		22.60	5/26/2012	14:24	248.70
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	dry		24.24	9/9/2012	16:00	Suspected Dry (Water Elevation <246.7 feet bgs)
MW11 MW11	11MP12SB 11MP12SB	23.0 23.0	12.0 - 22.0 12.0 - 22.0	268.70 268.70	271.30 271.30	dry dry		23.69 24.08	6/17/2015 8/12/2015	15:52 12:11	Suspected Dry (Water Elevation <246.7 feet bgs) Suspected Dry (Water Elevation <246.7 feet bgs)
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	dry		24.36	9/2/2015	10:30	Suspected Dry (Water Elevation <246.7 feet bgs)
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	dry	25.70 25.63	24.16	9/10/2015	NR	Suspected Dry (Water Elevation <246.7 feet bgs)
MW11 MW11	11MP12SB 11MP12SB	23.0 23.0	12.0 - 22.0 12.0 - 22.0	268.70 268.70	271.30 271.30	dry dry	25.63 NR	21.60 25.20	9/28/2016 5/26/2017	NR 12:56	249.70 246.10
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	dry	25.42	21.26	9/26/2017	13:41	250.04
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	dry	NR NB	19.12	5/18/2018	13:21	252.18 252.60
MW11 MW11	11MP12SB 11MP12SB	23.0 23.0	12.0 - 22.0 12.0 - 22.0	268.70 268.70	271.30 271.30		NR NR	18.61 25.63	5/18/2019 9/10/2019	13:50 1248	252.69 245.67
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30		NR	21.42	6/17/2020	15:18	249.88
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	 10 TD	NR	23.82	9/2/2020	12:21	247.48 261.00
MW12 MW12	11RD13SB 11RD13SB	15.0 15.0	4.0 - 14.0 4.0 - 14.0	263.22 263.22	265.62 265.62	1.0 - TD 1.0 - TD		3.72 3.70	8/31/2011 9/1/2011	13:34 16:20	261.90 261.92
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD		2.46	5/26/2012	11:04	263.16
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD		3.30	9/9/2012	16:39	262.32 260.60
MW12 MW12	11RD13SB 11RD13SB	15.0 15.0	4.0 - 14.0 4.0 - 14.0	263.22 263.22	265.62 265.62	1.0 - TD 1.0 - TD		5.02 6.80	6/17/2015 8/12/2015	13:18 11:46	260.60 258.82
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD		6.98	9/2/2015	11:00	258.64
MW12 MW12	11RD13SB 11RD13SB	15.0 15.0	4.0 - 14.0 4.0 - 14.0	263.22	265.62 265.62	1.0 - TD 1.0 - TD	17.68 17.60	5.97 4.49	9/10/2015	NR 10:40	259.65 261.13
MW12 MW12	11RD13SB 11RD13SB	15.0 15.0	4.0 - 14.0 4.0 - 14.0	263.22 263.22	265.62 265.62	1.0 - TD 1.0 - TD	17.60 NR	6.49	9/28/2016 5/26/2017	10:40	261.13 259.13
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD	17.39	4.81	9/26/2017		260.81
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD	NR NB	4.44 ND	5/18/2018	12:26	261.18
MW12 MW12	11RD13SB 11RD13SB	15.0 15.0	4.0 - 14.0 4.0 - 14.0	263.22 263.22	265.62 265.62	1.0 - TD 1.0 - TD	NR NR	NR NR	5/18/2019 9/10/2019	12:41	Inner casing damaged from settling of outer casing,
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD	NR	NR	6/17/2020		preventing access for DTW measurements.
MW12	11RD13SB 11MP20SB	15.0 32.0	4.0 - 14.0	263.22	265.62	1.0 - TD	NR	NR	9/2/2020	 19:04	246.65
MW13 MW13	11MP20SB 11MP20SB	32.0 32.0	21.0 - 31.0 21.0 - 31.0	274.30 274.30	276.70 276.70	27.0 - TD 27.0 - TD		30.05 29.70	8/30/2011 9/1/2011	18:04 16:09	246.65
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Table 3-1	Well Construction and	Groundwater Depth Information
i abie 3-1	well Construction and	Groundwater Depth Information

Table 3-1 W	ell Construct	ion and Groundy	and Groundwater Depth Information					1			
Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Depth (feet below TOC)	Water Level Date	Time	Ground Water Elevation (feet NAVD88)
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD		18.41	5/26/2012	13:45	258.29
MW13 MW13	11MP20SB 11MP20SB	32.0 32.0	21.0 - 31.0 21.0 - 31.0	274.30 274.30	276.70 276.70	27.0 - TD 27.0 - TD		24.06 29.85	9/9/2012 6/17/2015	16:50 12:13	252.64 246.85
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD 27.0 - TD		DRY	8/12/2015	11:51	Dry (Water Elevation <243.3 feet bgs)
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD		DRY	9/2/2015	10:45	Dry (Water Elevation <243.3 feet bgs)
MW13 MW13	11MP20SB 11MP20SB	32.0 32.0	21.0 - 31.0 21.0 - 31.0	274.30 274.30	276.70 276.70	27.0 - TD 27.0 - TD	31.70	DRY	9/10/2015	NR 40.55	Dry (Water Elevation <243.3 feet bgs) 252.35
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD	31.65 31.65	24.35 DRY	9/28/2016 5/26/2017	12:55 NR	Dry (Water Elevation <243.3 feet bgs)
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD	31.65	25.90	9/26/2017	1454	250.80
MW13 MW13	11MP20SB 11MP20SB	32.0 32.0	21.0 - 31.0 21.0 - 31.0	274.30 274.30	276.70 276.70	27.0 - TD 27.0 - TD	NR NR	19.14 14.88	5/18/2018 5/18/2019	12:42 12:50	257.56 261.82
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD	31.65	DRY	9/10/2019	1420	Dry (Water Elevation <243.3 feet bgs)
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD	31.65	DRY	6/17/2020	15:52	Dry (Water Elevation <243.3 feet bgs)
MW13 MW14	11MP20SB 11MP25SB	32.0 36.0	21.0 - 31.0 25.0 - 35.0	274.30 246.71	276.70 249.01	27.0 - TD 25.7 - TD	NR	NR 30.51	9/2/2020 8/31/2011	12:55 10:05	Frost jacked, unusable for DTW measurements 218.50
MW14	11MP25SB	36.0	25.0 - 35.0	246.71	249.01	25.7 - TD		30.01	9/1/2011	16:00	219.00
MW14 MW14	11MP25SB 11MP25SB	36.0 36.0	25.0 - 35.0 25.0 - 35.0	246.71 246.71	249.01 249.01	25.7 - TD 25.7 - TD		24.40 27.34	5/26/2012 9/10/2012	14:45 17:35	224.61 221.67
MW14	11MP25SB	36.0	25.0 - 35.0	246.71	249.01	25.7 - TD					Decommissioned in 2014 NTCRA
MW15	11MP29SB	26.0	15.0 - 25.0	242.63	244.93	16.2 - TD		19.64	8/30/2011	10:35	225.29
MW15 MW15	11MP29SB 11MP29SB	26.0 26.0	15.0 - 25.0 15.0 - 25.0	242.63 242.63	244.93 244.93	16.2 - TD 16.2 - TD		19.59 18.33	9/1/2011 5/26/2012	15:56 14:56	225.34 226.60
MW15	11MP29SB	26.0	15.0 - 25.0	242.63	244.93	16.2 - TD		18.30	9/8/2012	13:00	226.63
MW15 MW16	11MP29SB 11MP30SB	26.0 22.0	15.0 - 25.0 11.0 - 21.0	242.63 226.09	244.93 228.09	16.2 - TD 16.0 - TD		 13.84	 8/30/2011	11:35	Decommissioned in 2014 NTCRA 214.25
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD		14.90	9/1/2011	15:50	213.19
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD		6.17	5/26/2012	15:08	221.92
MW16 MW16	11MP30SB 11MP30SB	22.0 22.0	11.0 - 21.0 11.0 - 21.0	226.09 226.09	228.09 228.09	16.0 - TD 16.0 - TD		8.88 13.13	9/8/2012 6/18/2015	14:30 19:52	219.21 214.96
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD		14.80	8/12/2015	12:19	213.29
MW16 MW16	11MP30SB 11MP30SB	22.0 22.0	11.0 - 21.0 11.0 - 21.0	226.09 226.09	228.09 228.09	16.0 - TD 16.0 - TD	24.14	15.19 14.81	9/2/2015 9/10/2015	9:35 NR	212.90 213.28
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD	24.14	8.58	9/28/2016	13:33	219.51
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD	24.08	15.09	5/26/2017	11:46	213.00
MW16 MW16	11MP30SB 11MP30SB	22.0 22.0	11.0 - 21.0 11.0 - 21.0	226.09 226.09	228.09 228.09	16.0 - TD 16.0 - TD	24.08 NR	10.32 5.40	9/26/2017 5/18/2018	13:14 13.44	217.77 222.69
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD	NR	4.00	5/18/2019	14:05	224.09
MW16 MW16	11MP30SB 11MP30SB	22.0 22.0	11.0 - 21.0 11.0 - 21.0	226.09 226.09	228.09 228.09	16.0 - TD 16.0 - TD	NR NR	14.9 13.25	9/10/2019 6/17/2020	1345 15:52	213.19 214.84
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD	NR	15.17	9/2/2020	12:00	212.92
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD		15.00	8/30/2011	9:20	213.66
MW17 MW17	11MP91SB 11MP91SB	52.5 52.5	41.5 - 51.5 41.5 - 51.5	226.36 226.36	228.66 228.66	25.0 - 33.0, 33.0 - TD 25.0 - 33.0, 33.0 - TD		13.78 8.20	9/1/2011 5/26/2012	15:52 15:03	214.88 220.46
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD		10.79	9/8/2012	16:20	217.87
MW17 MW17	11MP91SB 11MP91SB	52.5 52.5	41.5 - 51.5 41.5 - 51.5	226.36 226.36	228.66 228.66	25.0 - 33.0, 33.0 - TD 25.0 - 33.0, 33.0 - TD		15.03 17.01	6/18/2015 8/12/2015	19:40 12:18	213.63 211.65
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD		17.01	9/2/2015	9:36	211.38
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD	55.02	19.93	9/10/2015	NR	208.73
MW17 MW17	11MP91SB 11MP91SB	52.5 52.5	41.5 - 51.5 41.5 - 51.5	226.36 226.36	228.66 228.66	25.0 - 33.0, 33.0 - TD 25.0 - 33.0, 33.0 - TD	54.80 54.77	10.58 17.19	9/28/2016 5/26/2017	13:22 11:35	218.08 211.47
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD	54.77	12.18	9/26/2017	1312	216.48
MW17 MW17	11MP91SB 11MP91SB	52.5 52.5	41.5 - 51.5 41.5 - 51.5	226.36 226.36	228.66 228.66	25.0 - 33.0, 33.0 - TD 25.0 - 33.0, 33.0 - TD	NR NR	7.50 6.32	5/18/2018 5/18/2019	13:41 14:05	221.16 222.34
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD	NR	17.29	9/10/2019	1350	211.37
MW17 MW17	11MP91SB 11MP91SB	52.5 52.5	41.5 - 51.5 41.5 - 51.5	226.36 226.36	228.66 228.66	25.0 - 33.0, 33.0 - TD 25.0 - 33.0, 33.0 - TD	NR NR	15.49 17.45	6/17/2020	13:25 12:06	213.17 211.21
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD	INIX	29.66	9/2/2020 8/31/2011	15:47	211.21
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD		29.87	9/1/2011	15:37	213.96
MW18 MW18	11MP31SB 11MP31SB	40.0 40.0	29.0 - 39.0 29.0 - 39.0	241.33 241.33	243.83 243.83	38.0 - TD 38.0 - TD		21.82 24.83	5/26/2012 9/9/2012	13:10 17:20	222.01 219.00
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD		29.17	6/17/2015	10:46	214.66
MW18 MW18	11MP31SB 11MP31SB	40.0 40.0	29.0 - 39.0 29.0 - 39.0	241.33 241.33	243.83 243.83	38.0 - TD 38.0 - TD		31.43 31.65	8/12/2015 9/2/2015	9:30	212.40 212.18
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD	41.57	31.20	9/10/2015	NR	212.63
MW18	11MP31SB	40.0	29.0 - 39.0 29.0 - 39.0	241.33	243.83	38.0 - TD	41.38	23.85	9/28/2016	13:55	219.98
MW18 MW18	11MP31SB 11MP31SB	40.0 40.0	29.0 - 39.0 29.0 - 39.0	241.33 241.33	243.83 243.83	38.0 - TD 38.0 - TD	NR 41.14	30.85 25.66	5/26/2017 9/26/2017	11:14 1246	212.98 218.17
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD	NR	20.64	5/18/2018	11:51	223.19
MW18 MW18	11MP31SB 11MP31SB	40.0 40.0	29.0 - 39.0 29.0 - 39.0	241.33 241.33	243.83 243.83	38.0 - TD 38.0 - TD	NR NR	18.59 31.73	5/18/2019 9/10/2019	14:22 1358	225.24 212.10
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD	NR	29.62	6/17/2020	13:23	214.21
MW18 MW19	11MP31SB 11MP33SB	40.0 43.0	29.0 - 39.0 32.0 - 42.0	241.33 237.70	243.83 240.00	38.0 - TD 39.0 - TD	NR	31.81 19.47	9/2/2020 9/1/2011	13:46 15:32	212.02 220.53
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD		19.47	5/26/2012	12:59	228.46
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD		16.02	9/9/2012	17:25	223.98
MW19 MW19	11MP33SB 11MP33SB	43.0 43.0	32.0 - 42.0 32.0 - 42.0	237.70 237.70	240.00 240.00	39.0 - TD 39.0 - TD		18.48 23.48	6/17/2015 8/12/2015	10:31 12:33	221.52 216.52
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD		24.95	9/2/2015	9:20	215.05
MW19 MW19	11MP33SB 11MP33SB	43.0 43.0	32.0 - 42.0 32.0 - 42.0	237.70 237.70	240.00 240.00	39.0 - TD 39.0 - TD	45.70 45.50	23.94 14.67	9/10/2015 9/28/2016	NR 14:00	216.06 225.33
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD	45.50	27.02	5/26/2017	11:05	212.98
MW19 MW19	11MP33SB 11MP33SB	43.0	32.0 - 42.0 32.0 - 42.0	237.70 237.70	240.00 240.00	39.0 - TD 39.0 - TD	45.50 NR	15.90 12.30	9/26/2017 5/18/2018	1238 13:57	224.10 227.70
MW19	11MP33SB 11MP33SB	43.0 43.0	32.0 - 42.0 32.0 - 42.0	237.70	240.00	39.0 - TD 39.0 - TD	NR NR	12.30	5/18/2018 5/18/2019	13:57	227.70
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD	NR	27.6	9/10/2019	1515	212.40
MW19 MW19	11MP33SB 11MP33SB	43.0 43.0	32.0 - 42.0 32.0 - 42.0	237.70 237.70	240.00 240.00	39.0 - TD 39.0 - TD	NR NR	20.25 27.11	6/17/2020 9/2/2020	13:17 13:50	219.75 212.89
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	1111	6.89	8/31/2011	8:53	208.31
MW20 MW20	11MP38SB 11MP38SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	212.90 212.90	215.20 215.20	6.5 - TD 6.5 - TD		6.97 4.82	9/1/2011 5/26/2012	15:43 15:26	208.23 210.38
MW20	11MP38SB	15.5	4.5 - 14.5 4.5 - 14.5	212.90	215.20	6.5 - TD		4.82 5.53	9/9/2012	10:10	210.38
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD		7.11	6/17/2015	10:18	208.09
MW20 MW20	11MP38SB 11MP38SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	212.90 212.90	215.20 215.20	6.5 - TD 6.5 - TD		7.92 8.12	8/12/2015 9/2/2015	12:39 9:10	207.28 207.08
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	17.70	7.96	9/10/2015	NR	207.24
MW20 MW20	11MP38SB 11MP38SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	212.90 212.90	215.20 215.20	6.5 - TD 6.5 - TD	17.70 NR	5.35 8.60	9/28/2016 5/26/2017	14:15 10:50	209.85 206.60
14144 20	0000	10.0	17.0	£12.00	_ 10.ZU	0.0 - 1D	INIX	0.00	UIZUIZU I I	10.00	200.00

Table 3-1	Well Construction and	Groundwater Depth Information
i abie 3-1	well Construction and	Groundwater Depth Information

Table 3-1 W	ell Construct	ion and Groundw	vater Depth Info	rmation				Static	: Water Level		
Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Depth (feet below TOC)	Date	Time	Ground Water Elevation (feet NAVD88)
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	17.47	6.32	9/26/2017	1303	208.88
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	NR	5.69	5/18/2018	13:57	209.51
MW20 MW20	11MP38SB 11MP38SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	212.90 212.90	215.20 215.20	6.5 - TD 6.5 - TD	NR NR	4.95 8.62	5/18/2019 9/10/2019	14:15 1457	210.25 206.58
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	NR	7.4	6/17/2020	13:33	207.80
MW20 MW21	11MP38SB 11MP39SB	15.5 17.5	4.5 - 14.5 6.5 - 16.5	212.90 208.23	215.20 210.13	6.5 - TD 7.0 - TD	NR	8.56 8.80	9/2/2020 8/31/2011	13:18 10:16	206.64 201.33
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD		8.82	9/1/2011	17:10	201.31
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD		7.91	5/26/2012	15:36	202.22
MW21 MW21	11MP39SB 11MP39SB	17.5 17.5	6.5 - 16.5 6.5 - 16.5	208.23 208.23	210.13 210.13	7.0 - TD 7.0 - TD		8.29 8.55	9/8/2012 6/17/2015	17:35 10:08	201.84 201.58
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD		9.10	8/12/2015	12:39	201.03
MW21 MW21	11MP39SB 11MP39SB	17.5 17.5	6.5 - 16.5 6.5 - 16.5	208.23 208.23	210.13 210.13	7.0 - TD 7.0 - TD	10.67	9.45 9.14	9/2/2015 9/10/2015	9:00 NR	200.68 200.99
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD	19.60	8.01	9/28/2016	14:30	202.12
MW21 MW21	11MP39SB 11MP39SB	17.5 17.5	6.5 - 16.5 6.5 - 16.5	208.23 208.23	210.13 210.13	7.0 - TD 7.0 - TD	NR 19.39	8.91 8.13	5/26/2017 9/26/2017	10:34 1229	201.22 202.00
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD 7.0 - TD	NR	7.94	5/18/2018	13:50	202.00
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD	NR	7.60	5/18/2019	14:39	202.53
MW21 MW21	11MP39SB 11MP39SB	17.5 17.5	6.5 - 16.5 6.5 - 16.5	208.23 208.23	210.13 210.13	7.0 - TD 7.0 - TD	NR NR	10.41 8.81	9/10/2019 6/17/2020	1500 13:37	199.72 201.32
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD	NR	10.32	9/2/2020	13:24	199.81
MW22 MW22	11MP40SB 11MP40SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	203.10 203.10	205.10 205.10	7.8 - TD 7.8 - TD		8.20 8.48	8/31/2011 9/1/2011	11:08 17:04	196.90 196.62
MW22	11MP40SB	15.5	4.5 - 14.5	203.10	205.10	7.8 - TD		5.55	5/26/2012	15:44	199.55
MW22 MW22	11MP40SB 11MP40SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	203.10 203.10	205.10 205.10	7.8 - TD 7.8 - TD		7.77 8.47	9/9/2012 6/17/2015	17:35 9:46	197.33 196.63
MW22	11MP40SB	15.5	4.5 - 14.5 4.5 - 14.5	203.10	205.10	7.8 - TD 7.8 - TD		10.01	8/12/2015	12:43	195.09
MW22	11MP40SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	203.10	205.10	7.8 - TD	17 74	10.33	9/2/2015	8:50	194.77
MW22 MW22	11MP40SB 11MP40SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	203.10 203.10	205.10 205.10	7.8 - TD 7.8 - TD	17.74 17.66	10.19 6.65	9/10/2015 9/28/2016	NR 14:40	194.91 198.45
MW22	11MP40SB	15.5	4.5 - 14.5	203.10	205.10	7.8 - TD	NR	10.45	5/26/2017	10:21	194.65
MW22 MW22	11MP40SB 11MP40SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	203.10 203.10	205.10 205.10	7.8 - TD 7.8 - TD	17.50 NR	7.23 5.63	9/26/2017 5/18/2018	1220 13:44	197.87 199.47
MW22	11MP40SB	15.5	4.5 - 14.5	203.10	205.10	7.8 - TD	NR	5.20	5/18/2019	14:44	199.90
MW22 MW22	11MP40SB 11MP40SB	15.5 15.5	4.5 - 14.5 4.5 - 14.5	203.10 203.10	205.10 205.10	7.8 - TD 7.8 - TD	NR NR	10.75 9.4	9/10/2019 6/17/2020	1502 13:39	194.35 195.70
MW22	11MP40SB	15.5	4.5 - 14.5	203.10	205.10	7.8 - TD	NR	10.79	9/2/2020	13:29	194.31
MW23 MW23	11MP66SB 11MP66SB	29.0 29.0	18.0 - 28.0 18.0 - 28.0	201.96 201.96	204.16 204.16	20.0 - TD 20.0 - TD		16.02 16.01	8/30/2011 9/1/2011	16:31 15:14	188.14 188.15
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD		14.60	5/26/2012	15:56	189.56
MW23 MW23	11MP66SB 11MP66SB	29.0 29.0	18.0 - 28.0 18.0 - 28.0	201.96 201.96	204.16 204.16	20.0 - TD 20.0 - TD		15.56 15.88	9/9/2012 6/17/2015	17:47 14:15	188.60 188.28
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD		16.92	8/12/2015	11:06	187.24
MW23 MW23	11MP66SB 11MP66SB	29.0 29.0	18.0 - 28.0 18.0 - 28.0	201.96 201.96	204.16 204.16	20.0 - TD 20.0 - TD	30.95	16.63 16.54	9/2/2015 9/10/2015	11:10 NR	187.53 187.62
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD	28.86	15.53	9/28/2016	13:46	188.63
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD	NR	17.63	5/26/2017	13:00	186.53
MW23 MW23	11MP66SB 11MP66SB	29.0 29.0	18.0 - 28.0 18.0 - 28.0	201.96 201.96	204.16 204.16	20.0 - TD 20.0 - TD	30.58 NR	15.86 14.08	9/26/2017 5/18/2018	1634 13:27	188.30 190.08
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD	NR	13.48	5/18/2019	15:41	190.68
MW23 MW23	11MP66SB 11MP66SB	29.0 29.0	18.0 - 28.0 18.0 - 28.0	201.96 201.96	204.16 204.16	20.0 - TD 20.0 - TD	NR NR	16.05 15.89	9/10/2019 6/17/2020	1228 16:27	188.11 188.27
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD	NR	16.71	9/2/2020	17:59	187.45
MW24 MW24	11MP62SB 11MP62SB	30.0 30.0	19.0 - 29.0 19.0 - 29.0	221.41 221.41	223.51 223.51	20.0 - TD 20.0 - TD		17.70 17.61	8/30/2011 9/1/2011	14:51 15:06	205.81 205.90
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD		14.59	5/26/2012	16:15	208.92
MW24 MW24	11MP62SB 11MP62SB	30.0 30.0	19.0 - 29.0 19.0 - 29.0	221.41 221.41	223.51 223.51	20.0 - TD 20.0 - TD		16.45 16.89	9/9/2012 6/17/2015	14:00 14:31	207.06 206.62
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD		17.88	8/12/2015	10:58	205.63
MW24 MW24	11MP62SB 11MP62SB	30.0 30.0	19.0 - 29.0 19.0 - 29.0	221.41 221.41	223.51 223.51	20.0 - TD 20.0 - TD	32.30	19.02 17.88	9/2/2015 9/10/2015	11:12 NR	204.49 205.63
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD	32.22	15.40	9/28/2016	13:26	208.11
MW24 MW24	11MP62SB 11MP62SB	30.0 30.0	19.0 - 29.0 19.0 - 29.0	221.41 221.41	223.51 223.51	20.0 - TD 20.0 - TD	NR 31.97	18.21 15.96	5/26/2017 9/26/2017	12:48 1651	205.30 207.55
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD	NR	14.90	5/18/2018	13:15	208.61
MW24 MW24	11MP62SB 11MP62SB	30.0 30.0	19.0 - 29.0 19.0 - 29.0	221.41 221.41	223.51 223.51	20.0 - TD 20.0 - TD	NR NR	14.20 18.74	5/18/2019 9/10/2019	15:51 1213	209.31 204.77
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD	NR	17.18	6/17/2020	21:30	206.33
MW24 MW25	11MP62SB 11MP89SB	30.0 42.0	19.0 - 29.0 31.0 - 41.0	221.41 237.56	223.51 239.76	20.0 - TD 32.0 - TD	NR	18.54 31.85	9/2/2020 8/30/2011	17:49 18:02	204.97 207.91
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD		31.88	9/1/2011	14:50	207.88
MW25 MW25	11MP89SB 11MP89SB	42.0 42.0	31.0 - 41.0 31.0 - 41.0	237.56 237.56	239.76 239.76	32.0 - TD 32.0 - TD		29.74 33.87	5/26/2012 9/9/2012	16:22 10:30	210.02 205.89
MW25	11MP89SB	42.0 42.0	31.0 - 41.0 31.0 - 41.0	237.56	239.76	32.0 - TD 32.0 - TD		33.87	6/17/2015	14:40	207.95
MW25 MW25	11MP89SB 11MP89SB	42.0 42.0	31.0 - 41.0 31.0 - 41.0	237.56 237.56	239.76 239.76	32.0 - TD 32.0 - TD		32.48 32.60	8/12/2015 9/2/2015	10:56 11:20	207.28 207.16
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD 32.0 - TD	44.43	32.60	9/2/2015	NR	207.31
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD	40.24	30.38	9/28/2016	13:22	209.38
MW25 MW25	11MP89SB 11MP89SB	42.0 42.0	31.0 - 41.0 31.0 - 41.0	237.56 237.56	239.76 239.76	32.0 - TD 32.0 - TD	NR 44.44	32.73 30.99	5/26/2017 9/26/2017	12:41 1705	207.03 208.77
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD	NR	29.51	5/18/2018	13:08	210.25
MW25 MW25	11MP89SB 11MP89SB	42.0 42.0	31.0 - 41.0 31.0 - 41.0	237.56 237.56	239.76 239.76	32.0 - TD 32.0 - TD	NR NR	28.54 32.85	5/18/2019 9/10/2019	15:57 1202	211.22 206.91
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD	NR	32.11	6/17/2020	16:41	207.65
MW25 MW26	11MP89SB 11MP52SB	42.0 43.0	31.0 - 41.0 32.0 - 42.0	237.56 244.03	239.76 245.93	32.0 - TD 34.0 - TD	NR	32.94 36.25	9/2/2020 8/30/2011	17:39 11:35	206.82 209.68
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD		36.30	9/1/2011	14:47	209.63
MW26 MW26	11MP52SB 11MP52SB	43.0 43.0	32.0 - 42.0 32.0 - 42.0	244.03 244.03	245.93 245.93	34.0 - TD 34.0 - TD		32.76 34.01	5/26/2012 9/9/2012	16:30 17:55	213.17 211.92
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD		36.04	6/17/2015	14:48	209.89
MW26 MW26	11MP52SB 11MP52SB	43.0 43.0	32.0 - 42.0 32.0 - 42.0	244.03 244.03	245.93 245.93	34.0 - TD 34.0 - TD		36.98 37.24	8/12/2015 9/2/2015	10:50 11:25	208.95 208.69
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	45.13	36.42	9/10/2015	NR	209.51
MW26 MW26	11MP52SB 11MP52SB	43.0 43.0	32.0 - 42.0 32.0 - 42.0	244.03 244.03	245.93 245.93	34.0 - TD 34.0 - TD	45.05 45.01	33.09 35.53	9/28/2016 5/26/2017	13:10 12:35	212.84 210.40
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	45.01	33.20	9/26/2017	1710	212.73

Table 2.4	Vell Construction and Groundw	ator Donth Information
i abie 3-1	ven Construction and Groundw	ater Depth Information

Table 3-1 W	ell Construct	ion and Groundw	ater Depth Info	rmation							
Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Depth (feet below TOC)	Water Level Date	Time	Ground Water Elevation (feet NAVD88)
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	NR	31.08	5/18/2018	13:04	214.85
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	NR	29.99	5/18/2019	15:59	215.94
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	NR	36.41	9/10/2019	1158	209.52
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	NR	35.73	6/17/2020	16:32	210.20
MW26	11MP52SB 11MP60SB	43.0	32.0 - 42.0	244.03	245.93 242.94	34.0 - TD 29.0 - TD	NR	37.5	9/2/2020 8/30/2011	17:36 16:50	208.43
MW27 MW27	11MP60SB	34.0 34.0	23.0 - 33.0 23.0 - 33.0	241.04 241.04	242.94	29.0 - TD 29.0 - TD		30.30 30.37	9/1/2011	14:58	212.64 212.57
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD		26.28	5/26/2012	16:38	216.66
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD		28.64	9/9/2012	12:50	214.30
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD		34.41	6/17/2015	14:58	Suspected Dry (Water Elevation <208.4 feet)
MW27 MW27	11MP60SB 11MP60SB	34.0 34.0	23.0 - 33.0 23.0 - 33.0	241.04 241.04	242.94 242.94	29.0 - TD 29.0 - TD		NR 31.42	8/12/2015 9/2/2015	NR 22:30	 211.52
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	35.77	31.24	9/10/2015	22.30 NR	211.52
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	35.70	27.51	9/28/2016	12:46	215.43
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	35.65	31.52	5/26/2017	12:30	211.42
MW27 MW27	11MP60SB 11MP60SB	34.0 34.0	23.0 - 33.0 23.0 - 33.0	241.04 241.04	242.94 242.94	29.0 - TD 29.0 - TD	35.65 NR	28.83 24.86	9/26/2017 5/18/2018	1718 12:57	214.11 218.08
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	NR	23.41	5/18/2019	16:08	219.53
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	NR	31.24	9/10/2019	1153	211.70
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	NR	30.2	6/17/2020	16:51	212.74
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD 49.0 - TD	NR	31.54	9/2/2020 8/30/2011	17:32	211.40
MW28 MW28	11MP88SB 11MP88SB	64.0 64.0	53.0 - 63.0 53.0 - 63.0	239.94 239.94	241.94 241.94	49.0 - TD		25.50 28.61	9/1/2011	14:57 14:53	216.44 213.33
MW28	11MP88SB		53.0 - 63.0	239.94	241.94	49.0 - TD		24.19	5/26/2012	16:41	217.75
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD		27.01	9/10/2012	15:43	214.93
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	1	28.90	6/17/2015	15:08	213.04
MW28 MW28	11MP88SB 11MP88SB	64.0 64.0	53.0 - 63.0 53.0 - 63.0	239.94 239.94	241.94 241.94	49.0 - TD 49.0 - TD	+	29.88 30.10	8/12/2015 9/2/2015	10:46 11:35	212.06 211.84
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	65.87	29.95	9/10/2015	NR	211.99
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	65.65	25.74	9/28/2016	13:00	216.20
MW28 MW28	11MP88SB 11MP88SB	64.0 64.0	53.0 - 63.0 53.0 - 63.0	239.94 239.94	241.94 241.94	49.0 - TD 49.0 - TD	65.58 65.58	30.13 27.05	5/26/2017 9/26/2017	12:25 1721	211.81 214.89
MW28	11MP88SB 11MP88SB		53.0 - 63.0	239.94	241.94	49.0 - TD 49.0 - TD	05.58 NR	27.05	5/18/2018	1721	214.89
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	NR	21.47	5/18/2019	16:08	220.47
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	NR	29.99	9/10/2019	1150	211.95
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	NR	28.84	6/17/2020	16:47	213.10
MW28 MW29	11MP88SB 11MP41SB	64.0 70.0	53.0 - 63.0 59.0 - 69.0	239.94 280.35	241.94 282.25	49.0 - TD 61.0 - TD	NR	30.25 63.21	9/2/2020 9/1/2011	17:30 13:20	211.69 219.04
MW29	11MP41SB		59.0 - 69.0	280.35	282.25	61.0 - TD		52.65	5/26/2012	17:09	229.60
MW29	11MP41SB		59.0 - 69.0	280.35	282.25	61.0 - TD		61.20	9/9/2012	16:22	221.05
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD		64.08	6/17/2015	15:41	218.17
MW29 MW29	11MP41SB 11MP41SB		59.0 - 69.0 59.0 - 69.0	280.35 280.35	282.25 282.25	61.0 - TD 61.0 - TD		66.60 66.89	8/12/2015 9/2/2015	11:12 12:11	215.65 215.36
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	71.75	66.81	9/10/2015	NR	215.44
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	71.59	55.01	9/28/2016	12:11	227.24
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	71.52	55.68	5/26/2017 9/26/2017	11:45 1818	226.57
MW29 MW29	11MP41SB 11MP41SB	70.0 70.0	59.0 - 69.0 59.0 - 69.0	280.35 280.35	282.25 282.25	61.0 - TD 61.0 - TD	71.52 NR	58.36 48.60	5/18/2018	12:19	223.89 233.65
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	NR	46.27	5/18/2019	16:55	235.98
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	NR	67.41	9/14/2019	13:00	214.84
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	NR	62.68	6/17/2020	20:10	219.57
MW29 MW30	11MP41SB 11SM31SB	70.0 53.0	59.0 - 69.0 42.0 - 52.0	280.35 275.71	282.25 277.41	61.0 - TD 45.0 - TD	NR	NR 53.53	9/2/2020 9/1/2011	17:11 14:35	<pre><217.75 feet Suspected Dry (Water Elevation <223.7 feet)</pre>
MW30	11SM31SB		42.0 - 52.0	275.71	277.41	45.0 - TD		52.63	5/26/2012	16:58	Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB	53.0	42.0 - 52.0	275.71	277.41	45.0 - TD		NR	9/9/2012	NR	Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB 11SM31SB		42.0 - 52.0	275.71 275.71	277.41 277.41	45.0 - TD 45.0 - TD		54.25	6/17/2015 8/12/2015	19:33 11:19	Suspected Dry (Water Elevation <223.7 feet) Suspected Dry (Water Elevation <223.7 feet)
MW30 MW30	11SM31SB		42.0 - 52.0 42.0 - 52.0	275.71	277.41	45.0 - TD		54.28 54.32	9/2/2015	12:15	Suspected Dry (Water Elevation <223.7 feet) Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB	53.0	42.0 - 52.0	275.71	277.41	45.0 - TD	55.63	54.45	9/10/2015	NR	Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB		42.0 - 52.0	275.71	277.41	45.0 - TD	55.40	54.22	9/28/2016	12:24	Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB		42.0 - 52.0	275.71	277.41	45.0 - TD	55.35 55.35	54.23 54.27	5/26/2017 9/26/2017	11:35	Suspected Dry (Water Elevation <223.7 feet)
MW30 MW30	11SM31SB 11SM31SB	53.0 53.0	42.0 - 52.0 42.0 - 52.0	275.71 275.71	277.41 277.41	45.0 - TD 45.0 - TD	95.35 NR	52.80	5/18/2018	12:12	Suspected Dry (Water Elevation <223.7 feet) Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB		42.0 - 52.0	275.71	277.41	45.0 - TD	NR	51.31	5/18/2019	17:03	Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB	53.0	42.0 - 52.0	275.71	277.41	45.0 - TD	NR	54.28	9/10/2019	1930	Suspected Dry (Water Elevation <223.7 feet)
MW30 MW30	11SM31SB 11SM31SB		42.0 - 52.0 42.0 - 52.0	275.71 275.71	277.41 277.41	45.0 - TD 45.0 - TD	NR NR	54.29 54.25	6/17/2020 9/2/2020	20:15 17:18	Suspected Dry (Water Elevation <223.7 feet) Suspected Dry (Water Elevation <223.7 feet)
MW31	11SM31SB 11UP11SB	44.8	33.8 - 43.8	495.79	497.99	45.0 - TD 34.0 - TD	INIX	37.75	8/29/2011	17:18	Suspected Dry (water Elevation <223.7 feet) 460.24
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD		37.51	9/1/2011	14:05	460.48
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD		34.12	5/26/2012	10:10	463.87
MW31 MW31	11UP11SB 11UP11SB	44.8 44.8	33.8 - 43.8 33.8 - 43.8	495.79 495.79	497.99 497.99	34.0 - TD 34.0 - TD	+	36.29 39.31	9/9/2012 6/22/2015	18:10 19:09	461.70 458.68
MW31	11UP11SB	44.8	33.8 - 43.8 33.8 - 43.8	495.79 495.79	497.99 497.99	34.0 - TD 34.0 - TD	+	39.31 42.25	8/12/2015	19:09	458.68
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD		43.07	9/2/2015	12:45	454.92
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD	47.10	41.75	9/10/2015	NR	456.24
MW31 MW31	11UP11SB 11UP11SB	44.8 44.8	33.8 - 43.8	495.79 495.79	497.99 497.99	34.0 - TD 34.0 - TD	47.10 47.07	35.22 44.95	10/1/2016 5/26/2017	11:15 NR	462.77 453.04
MW31 MW31	11UP11SB	44.8	33.8 - 43.8 33.8 - 43.8	495.79 495.79	497.99 497.99	34.0 - TD 34.0 - TD	47.07	44.95 35.22	9/26/2017	NR NR	453.04 462.77
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD	NR	33.98	5/15/2018	NR	464.01
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD	NR	32.44	5/18/2019	19:51	465.55
MW31 MW31	11UP11SB 11UP11SB	44.8 44.8	33.8 - 43.8 33.8 - 43.8	495.79 495.79	497.99 497.99	34.0 - TD 34.0 - TD	NR NR	DRY 41.12	9/10/2019 6/17/2020	1605 21:12	Suspected Dry (Water Elevation <452 feet) 456.87
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD	44.95	41.12 DRY	9/2/2020	16:11	Suspected Dry (Water Elevation <452 feet)
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD		18.90	8/31/2011	15:55	177.68
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD		18.86	9/1/2011	15:26	177.72
MW32 MW32	11RD05SB 11RD05SB	25.0 25.0	14.0 - 24.0 14.0 - 24.0	194.38 194.38	196.58 196.58	16.5 - TD 16.5 - TD	+	16.71 17.21	5/26/2012 9/8/2012	12:45 15:40	179.87 179.37
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	 	19.03	6/17/2015	9:30	179.57
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD		19.49	8/12/2015	12:47	177.09
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	00.70	20.17	9/2/2015	12:45	176.41
MW32 MW32	11RD05SB 11RD05SB	25.0 25.0	14.0 - 24.0 14.0 - 24.0	194.38 194.38	196.58 196.58	16.5 - TD 16.5 - TD	26.73 26.43	20.05 18.35	9/10/2015 9/28/2016	NR 14:13	176.53 178.23
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	26.70	21.33	5/26/2017	9:53	175.25
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	26.70	18.00	9/26/2017	1212	178.58
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58 106.58	16.5 - TD	NR ND	17.16 16.10	5/18/2018	13:38	179.42 180.30
MW32 MW32	11RD05SB 11RD05SB	25.0 25.0	14.0 - 24.0 14.0 - 24.0	194.38 194.38	196.58 196.58	16.5 - TD 16.5 - TD	NR NR	16.19 21.19	5/18/2019 9/10/2019	14:54 1445	180.39 175.39
IVIVVUL	1 11100000	۷.0	i ¬r.∪ - ∠ † .∪	107.00	100.00	10.0 - 10	IVIX	£1.13	2/ 10/ 2013	T-+1)	110.00

Table 3-1	Well Construction and	Groundwater Depth Information
i abie 3-1	well Construction and	Groundwater Depth Information

No.	Table 3-1 W	<i>l</i> ell Construct	ion and Groundv	vater Depth Info	rmation				Statio	: Water Level		
			Total Depth As Constructed	Screened Interval	Ground Elevation	Casing Elevation (feet		Total Depth (feet below	Depth (feet below		Time	Elevation
Color	MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	NR	19.11	6/17/2020	13:10	177.47
No. 50 1960								NR	21.06	9/2/2020	16:52	
MATERIAL 185,000 124,000 126												
MATERIAL 1985.00 153.00												
MAD 1 1 1 1 1 1 1 1 1												
MACH 1980-198 239 102 257 1975												
MANY												
WAST WESTERN 150 152 22 176 22 176 22 176 23 176 24								24.26				
West												
Mode												
MACS												
MASS AFFERNO P. A. 19. 29. 176												
MATS Mod Mod												
PFSS Mile NEW NEW SEC 200.00 264.0							10.0 - 11	NIX				
Month Month Mile 20,000 Mile Mile 20,000 Mile								22.80				
MANUAL MATERIAL MR												
Minds All John No. No.	MW34	AST5 MW1	NR	NR	290.95	294.25		NR	49.88	5/26/2017	12:30	244.37
Months												
March Marc	MW35	AST5 MW2	NR	NR	285.76	289.26			41.97	9/1/2011	16:55	247.29
Month Mont												
MAYON MAY MA								55 30				
MPGSS AST 5 M972 MR		AST5 MW2	NR	NR	285.76	289.26			-		NR	253.23
Month Mont												
MOVIS ASTS 69V2 MR												
Montrol ASP Montrol ASP Montrol ASP ASP												
WAYSS ASTS WAYS NR												
MAY-10 MAY M												
MMY93 ASTS MMY3 NR								65.38				
Month Mont												
MAYOS ASTS MAYS NR												
MAY MATERIANY MR												
MW39 SM67 84.0	MW36	AST5 MW3	NR	NR	286.33	290.03			14.15	5/18/2019	13:17	275.88
MY39 SM87 B40 63-83 432.83 452.65 B6.20 Dy (948) SM10215 NR1 Dy (Water Elevation 494.8 feet) MY39 SM67 B40 63-83 432.83 432.83 452.65 B6.50 Dy (948) SM20216 1140 Dy (Water Elevation 494.9 feet) MY39 SM67 B40 63-83 432.83 432.83 432.80 B6.50 Dy (948) SM20216 Dy (Water Elevation 494.9 feet) MY39 SM67 B40 63-83 432.83 432.83 432.83 MY38 SM27 B40 B40 B40 B40 B40 B40 B40 B40									-			· ` `
MM999 SM67 84.0 63 -83 422 83 450 28 86.02 Dry (PeN) Dry (PeN) Dry (PeN) Group of the Company Company												
MW39 SM67 84.0 63 - 83 432.83 435.26 85.89 Dyy (Pel) D95/2017 10.59 Dyy, Water Elevation												

Table 3-1 W	ell Construct	ion and Groundy	water Depth Info	rmation							
Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed	Reported Screened Interval	Surveyed Ground Elevation	Surveyed Top of Casing Elevation	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below	Station Statio	: Water Level Date	Time	Ground Water Elevation
		(feet bgs)	(feet bgs)	(feet NAVD88)	(feet NAVD88)		TOC)	TOC)			(feet NAVD88)
MW45	SM73	82	61-81	397.70	400.37		NR	39.69	5/18/2019	18:20	360.68
MW45	SM73	82	61-81	397.70	400.37		NR	54.18	9/10/2019	1820	346.19
MW45	SM73	82	61-81	397.70	400.37		NR	45.9	6/17/2020	10:38	354.47
MW45	SM73	82	61-81	397.70	400.37		NR	52.88	9/2/2020	15:25	347.49
MW46	SM74	57 57	36-56	399.62	402.50 402.50	41	60.04	31.81	9/26/2017	1934 10:24	370.69
MW46 MW46	SM74 SM74	57 57	36-56 36-56	399.62 399.62	402.50		59.71 NR	30.62 29.32	5/18/2018 5/18/2019	18:12	371.88 373.18
MW46	SM74	57	36-56	399.62	402.50		NR	39.59	9/10/2019	1809	362.91
MW46	SM74	57	36-56	399.62	402.50		NR	35	6/17/2020	10:44	367.50
MW46	SM74	57	36-56	399.62	402.50	54	NR 70.00	38.97	9/2/2020	15:18	363.53
MW47 MW47	SM75 SM75	67 67	46-66 46-66	380.67 380.67	383.67 383.67	51	70.20 69.44	35.88 33.31	9/26/2017 5/18/2018	1941 10:21	347.79 350.36
MW47	SM75	67	46-66	380.67	383.67		NR	31.79	5/18/2019	17:46	351.88
MW47	SM75	67	46-66	380.67	383.67		NR	42.93	9/10/2019	1759	340.74
MW47	SM75	67	46-66	380.67	383.67		NR	38.42	6/17/2020	20:52	345.25
MW47 MW48	SM75 SM76	67 44.5	46-66 23-43	380.67 348.87	383.67 351.51	28	NR 46.76	42.13 19.23	9/2/2020 9/26/2017	15:12 1850	341.54 332.28
MW48	SM76	44.5	23-43	348.87	351.51	20	46.60	18.57	5/18/2018	11:47	332.26
MW48	SM76	44.5	23-43	348.87	351.51		NR	17.92	5/18/2019	17:15	333.59
MW48	SM76	44.5	23-43	348.87	351.51		NR	24.88	9/10/2019	1840	326.63
MW48	SM76	44.5	23-43	348.87	351.51		NR	20.44	6/17/2020	20:22	331.07
MW48 MW49	SM76 SM77	44.5 61.7	23-43 40-60	348.87 301.15	351.51 303.78	45	NR 64.14	23.19 27.81	9/2/2020 9/26/2017	16:32 1839	328.32 275.97
MW49	SM77	61.7	40-60	301.15	303.78		63.75	26.40	5/18/2018	12:00	277.38
MW49	SM77	61.7	40-60	301.15	303.78		NR	25.34	5/18/2019	16:46	278.44
MW49	SM77	61.7	40-60	301.15	303.78		NR	35.75	9/10/2019	1103	268.03
MW49 MW49	SM77 SM77	61.7 61.7	40-60 40-60	301.15 301.15	303.78 303.78		NR NR	30.25 34.51	6/17/2020 9/2/2020	20:02 16:40	273.53 269.27
MW50	SM78	92	71-91	439.58	442.6501	estimated 75	96.71	50.47	9/2/2020	2037	392.18
MW50	SM78	92	71-91	439.58	442.6501		95.36	42.81	5/18/2018	11:28	399.84
MW50	SM78	92	71-91	439.58	442.6501		NR	41.66	5/18/2019	19:07	400.99
MW50	SM78 SM78	92 92	71-91 71-91	439.58 439.58	442.6501 442.6501		NR NB	54.61	9/10/2019	1705	388.04 394.40
MW50 MW50	SM78	92	71-91	439.58	442.6501		NR NR	48.25 54.56	6/17/2020 9/2/2020	20:58 14:27	388.09
MW51	SM79	77	56-76	422.38	425.05	61	80.40	38.69	9/26/2017	2056	386.36
MW51	SM79	77	56-76	422.38	425.05		79.50	35.89	5/18/2018	10:58	389.16
MW51	SM79	77	56-76	422.38	425.05		NR	34.26	5/18/2019	19:16	390.79
MW51 MW51	SM79 SM79	77 77	56-76 56-76	422.38 422.38	425.05 425.05		NR NR	45.23 40.12	9/10/2019 6/17/2020	1655 21:11	379.82 384.93
MW51	SM79	77	56-76	422.38	425.05		NR	44.14	9/2/2020	14:10	380.91
MW52	SM80	56	35-55	383.91	386.83	40	59.72	29.67	9/26/2017	1949	357.16
MW52	SM80	56	35-55	383.91	386.83		59.33	27.36	5/18/2018	10:05	359.47
MW52 MW52	SM80 SM80	56 56	35-55 35-55	383.91 383.91	386.83 386.83		NR NR	26.36 37.8	5/18/2019 9/10/2019	18:03 1747	360.47 349.03
MW52	SM80	56	35-55	383.91	386.83		NR	32.61	6/17/2020	20:12	354.22
MW52	SM80	56	35-55	383.91	386.83		NR	36.94	9/2/2020	14:55	349.89
MW53	SM81	62	41-61	460.82	463.7785	46	65.60	29.90	9/26/2017	2118	433.88
MW53 MW53	SM81 SM81	62 62	41-61 41-61	460.82 460.82	463.7785 463.7785		65.00 NR	27.12 26.11	5/18/2018 5/18/2019	10:36 19:37	436.66 437.67
MW53	SM81	62	41-61	460.82	463.7785		NR	40.11	9/10/2019	1435	423.67
MW53	SM81	62	41-61	460.82	463.7785		NR	31.72	6/17/2020	21:33	432.06
MW53	SM81	62	41-61	460.82	463.7785		NR	38.34	9/2/2020	14:44	425.44
MW54 MW54	SM82 SM82	50 50	29-49 29-49	423.01 423.01	425.7406 425.7406	34	53.50 53.10	29.80 27.26	9/26/2017 5/18/2018	10:48	395.94 398.48
MW54	SM82	50	29-49	423.01	425.7406		NR	26.17	5/18/2019	18:54	390.40
MW54	SM82	50	29-49	423.01	425.7406		NR	33.22	9/10/2019	1642	392.52
MW54	SM82	50	29-49	423.01	425.7406		NR	29.77	6/17/2020	20:48	395.97
MW54	SM82	50	29-49	423.01	425.7406	40	NR 22.02	32.61	9/2/2020	14:18	393.13
MW55 MW55	SM83 SM83	27 27	10-20 10-20	341.26 341.26	344.09 344.09	13	23.92 22.57	12.27 10.85	9/26/2017 5/18/2018	9:50	331.82 333.24
MW55	SM83	27	10-20	341.26	344.09		NR	9.51	5/18/2019	17:54	334.58
MW55	SM83	27	10-20	341.26	344.09		NR	16.22	9/10/2019	1737	327.87
MW55	SM83	27	10-20	341.26	344.09		23.65	13.8	6/17/2020	20:00	330.29
MW55 MW56	SM83 SM84	27 76	10-20 55-75	341.26 408.55	344.09 411.329	60	NR 79.72	15.65 32.70	9/2/2020 9/26/2017	15:01 1913	328.44 378.63
MW56	SM84	76	55-75	408.55	411.329		78.65	30.61	5/18/2018	10:42	380.72
MW56	SM84	76	55-75	408.55	411.329		NR	29.69	5/18/2019	18:28	381.64
MW56	SM84	76	55-75	408.55	411.329		NR	52.24	9/10/2019	1727	359.09
MW56 MW56	SM84 SM84	76 76	55-75 55-75	408.55 408.55	411.329 411.329		NR NR	37.21 47.88	6/17/2020 9/2/2020	20:24 15:33	374.12 363.45
MW57	SM85	60	37.5-57.5	461.00	463.8141	44	61.45	30.65	9/2/2020	2107	433.16
MW57	SM85	60	37.5-57.5	461.00	463.8141	· ·	60.90	28.81	5/18/2018	11:41	435.00
MW57	SM85	60	37.5-57.5	461.00	463.8141		NR	28.62	5/18/2019	20:00	435.19
MW57	SM85	60	37.5-57.5	461.00	463.8141		NR	39.01	9/10/2019	1615	424.80
MW57 MW57	SM85 SM85	60 60	37.5-57.5 37.5-57.5	461.00 461.00	463.8141 463.8141		NR NR	34.24 38.54	6/17/2020 9/2/2020	20:41 16:03	429.57 425.27
MW58	SM86	58	36.62-56.62	469.84	472.7246	42	60.63	28.84	9/2/2020	2128	443.88
MW58	SM86	58	36.62-56.62	469.84	472.7246		60.39	27.90	5/18/2018	10:15	444.82
MW58	SM86	58	36.62-56.62	469.84	472.7246		NR	26.06	5/18/2019	19:28	446.66
MW58	SM86 SM86	58 58	36.62-56.62	469.84 469.84	472.7246 472.7246		NR NR	34.73	9/10/2019	1625	437.99 441.58
MW58 MW58	SM86 SM86	58 58	36.62-56.62 36.62-56.62	469.84 469.84	472.7246 472.7246		NR NR	31.14 33.82	6/17/2020 9/2/2020	21:24 14:35	441.58
MW59	SM87	161.5	140-160	432.63	435.4785	152	167.67	137.77	9/26/2017		297.71
MW59	SM87	161.5	140-160	432.63	435.4785		164.18	135.56	5/18/2018	10:54	299.92
MW59	SM87	161.5	140-160	432.63	435.4785		NR	132.44	5/18/2019	18:39	303.04
MW59 MW59	SM87 SM87	161.5 161.5	140-160 140-160	432.63 432.63	435.4785 435.4785		NR NR	134.33 132.66	9/10/2019 6/17/2020	1545 20:28	301.15 302.82
MW59		161.5	140-160	432.63	435.4785		NR	134.27			302.62
Notes				.52.55	.55.17.00	1			_ , _, _ 5_5	2.55	

Elevation datum: NAVD88 calculated using GEOID09.

Top of casing (TOC) refers to the top of PVC inner casing.

Key

PVC = polyvinyl chloride bgs = below ground surface TD = Total depth GW = groundwater TOC = Top of Casing NR = Not Recorded

NTCRA = non-time-critical removal action

Table 3-2. Red Devil Creek and Seep Discharge

Manitoring Location 1							Estimated	Discharge (cfs)						
Monitoring Location ¹	August 18, 2011	May 26, 2012	September 12, 2012	June 19, 2015	September 2, 2015	September 28 & 29, 2016	June 1, 2017 ²	September 16, 2017	September 27, 2017	May 19, 2018	May 18, 2019	September 10, 2019 ²	June 17, 2020	September 2, 2020
RD02	5.96	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored
RD03	4.09	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored
RD10	5.52	12.18	4.64	1.25	0.48	2.45	1.20	5.22	Station not monitored	11.60	11.47	0.42	0.54	0.40
RD14	Station not established	Station not established	Station not established	1.41	0.54	3.01	1.54	6.35	Station not monitored	10.84	12.87	0.37	Station not monitored	Station not monitored
RD04	5.95	12.67	3.45	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored
RD12	8.24	10.53	3.79	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored
RD13	Station not established	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored
RD15	Station not established	Station not established	Station not established	1.40	0.67	3.53	1.91	6.85	Station not monitored	15.80	13.04	0.41	0.88	0.39
RD05 (seep)	0.18	Station not monitored	0.16	0.23	0.19	0.35	0.01	0.05	Station not monitored	0.33	0.12	0.01	0.17	0.03
RD16	Station not established	Station not established	Station not established	1.61	0.60	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	12.14	0.47	Station not monitored	Station not monitored
RD09	5.98	13.36	3.40	1.40	0.80	2.43	1.55	6.23	Station not monitored	14.87	Station not monitored	Station not monitored	Station not monitored	Station not monitored
RD06	6.81	14.47	3.80	1.54	0.79	5.51	1.26	7.08	Station not monitored	13.69	15.15	0.33	1.11	0.43
RD07	7.61	Station not monitored	3.61	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored	Station not monitored
RD08	7.19	14.20	3.09	1.90	0.81	Station Inaccessible	2.15	7.38	5.21	10.41	13.12	0.26	1.28	0.44

Note

¹ Locations are organized from upstream to downstream along Red Devil Creek

² Flow at RD05 measured using 'bucket method.' Water was collected in a 5-liter volumetric container for 10 seconds. This process was repeated 5 times to generate an average volume per time.

Kev:

cfs = Cubic feet per second

Table 3-3. Groundwater Sample Results, Spring 2020

	Results, Spring 2020 Station ID			MW10	MW16	MW17	MW06	MW27	MW28	MW40	MW42	MW43	MW44	MW45	MW46	MW47	MW48	MW50
	Coornelia Area				Dack 1055 NADA			Dec 1055 NADA			Confess Minad Augs							
Analyte	Geographic Area		Units		Post-1955 MPA			Pre-1955 MPA			Surface Mined Area							
	Sample ID Method			0620MW10GW	0620MW16GW	0620MW17GW	0620MW06GW	0620MW27GW	0620MW28GW	0620MW40GW	0620MW42GW	0620MW43GW	0620MW44GW	0620MW45GW	0620MW46GW	0620MW47GW	0620MW48GW	0620MW50GW
Aluminum	Metals (ICP)	SW846 6010B	μg/L	110 U	140 J	110	U 110 U	110 U	J 200 .	J 110 U	110 U	110	U 150	J 490 J	110 U	110 U	110 U	110 U
Antimony	Metals (ICP/MS)	SW846 6020A	μg/L	0.55 U	540	4.8	8.9	7.8	4.8	5.9	350	1.7	J 0.55	U 0.55 U	J 0.55 U	0.55 U	2 J	9.1
Arsenic	Metals (ICP/MS)	SW846 6020A	μg/L	100	750	2.7	J 51	27	100	180	310	350	1.4	J 1.7 J	1 U	1 U	1.5 J	500
Barium	Metals (ICP/MS)	SW846 6020A	μg/L	95	64	43	91	38	53	120	120	140	30	6.5	2.1 J	1.1 U	34	290
Beryllium	Metals (ICP/MS)	SW846 6020A	μg/L	0.36 U	0.36 U	0.36	U 0.36 U	0.36 L	ال 0.36	J 0.36 U	0.36 U	0.36	U 0.36	U 0.36 U	J 0.36 U	0.36 U	0.36 U	0.36 U
Cadmium	Metals (ICP/MS)	SW846 6020A	μg/L	0.5 U	0.5 U	0.5	U 0.5 U	0.5 L	J 0.5 I	J 0.5 U	0.5 U	0.5	U 0.5	U 0.5 U	J 0.5 U	0.5 U	0.5 U	0.5 U
Calcium	Metals (ICP)	SW846 6010B	μg/L	21000	35000	24000	33000 J	84000	41000	46000	38000	24000	40000	18000	19000	17000	16000	70000
Chromium	Metals (ICP/MS)	SW846 6020A	μg/L	0.87 U	0.87 U	0.87	U 0.87 U	0.88 J	J 0.87 I	J 0.87 U	0.87 U	0.87	U 0.87	U 1.5 J	0.87 U	0.87 U	0.87 U	0.87 U
Cobalt	Metals (ICP/MS)	SW846 6020A	μg/L	0.2 U	12	0.2	U 2	2.1	3.2	26	4.3	26	2.9	0.23 J	0.2 U	0.2 U	0.2 U	2.8
Copper	Metals (ICP/MS)	SW846 6020A	μg/L	3 U	3 U	3	U 3 U	3 L	J 3 I	J 3 U	3 U	3	U 3	U 3 U	J 3 U	3 U	3 U	3 U
Iron	Metals (ICP)	SW846 6010B	μg/L	1100	19000	140	U 4800	140 L	J 1300	510	610	3600	1300	350 J	140 U	140 U	140 U	1400
Lead	Metals (ICP/MS)	SW846 6020A	μg/L	1 U	1 U	1	U 1 U	1 L	J 1 I	J 1 U	1 U	1	U 1	U 1 U	J 1 U	1 U	1 U	1 U
Magnesium	Metals (ICP)	SW846 6010B	μg/L	32000	69000	17000	31000 J	51000	32000	48000	28000	17000	35000	16000	19000	19000	14000	59000
Manganese	Metals (ICP/MS)	SW846 6020A	μg/L	120	7200	2.3	U 670	1300	850	270	580	2800	700	6.5 J	2.3 U	4.2 J	9.7 J	960
Mercury	Mercury (CVAA)	SW846 7470A	μg/L	0.15 U	0.31	0.15	U 0.15 U	0.32	0.18	J 0.15 U	0.15 U	0.15	U 0.15	U 0.15 U	J 0.15 U	0.15 U	0.15 U	0.15 U
Nickel	Metals (ICP/MS)	SW846 6020A	μg/L	0.62 U	6.1 J	0.62	U 2.9 J	27	7.9	J 95	19	71	2.8	U 0.84 U	J 0.62 U	0.62 U	0.62 U	7.6 J
Potassium	Metals (ICP)	SW846 6010B	μg/L	930 J	2000 J	410	U 710 J	1200 J	J 920 .	J 790 J	580 J	640	450	J 460 J	480 J	470 J	430 J	640 J
Selenium	Metals (ICP/MS)	SW846 6020A	μg/L	10 U	10 U	10	U 10 U	10 L	ا 10	J 10 U	10 U	10	U 10	U 10 U	J 10 U	10 U	10 U	10 U
Silver	Metals (ICP/MS)	SW846 6020A	μg/L	0.28 U	0.28 U	0.28	U 0.28 U	0.28 L	J 0.28 I	J 0.28 U	0.28 U	0.28	U 0.28	U 0.28 U	J 0.28 U	0.28 U	0.28 U	0.28 U
Sodium	Metals (ICP)	SW846 6010B	μg/L	3600	6100	2500	4500	14000	10000	1300 J	2500	3600	1500	J 480 J	2100	2100	1800 J	2500
Thallium	Metals (ICP/MS)	SW846 6020A	μg/L	0.33 U	0.33 U	0.33	U 0.33 U	0.33 L	J 0.33 I	J 0.33 U	0.33 U	0.33	U 0.33	U 0.33 U	J 0.33 U	0.33 U	0.33 U	0.33 U
Vanadium	Metals (ICP/MS)	SW846 6020A	μg/L	2.8 J	3.3 J	3.1	J 2.8 J	2.5 J	J 3.1	J 2.4 J	3.1 J	2.3	U 3	J 4.3 J	2.7 J	3.2 J	3.5 J	3.1 J
Zinc	Metals (ICP/MS)	SW846 6020A	μg/L	9.5 U	9.5 U	9.5	U 9.5 U	11J	9.5	J 9.5 U	9.5 U	9.5	U 9.5	U 9.5 U	J 9.5 U	9.5 U	9.5 U	9.5 U
Total Low Level Mercury																		
Mercury	Total Mercury by EPA 1631	EPA 1631	ng/L	11.7	975	11.8	2.08	487	1030	1.26	36.0	5.71	28.6	60.3	6.56	3.07	8.98	580
Dissolved Low Level Mercury																		
Mercury	Dissolved Mercury by EPA 1631	EPA 1631	ng/L	2.95	402	11.9	0.68	464	395	0.43	2.56	2.03	11.3	33.6	1.85	0.88	4.79	31.5
General Chemistry																		
Alkalinity	Alkalinity	SM 2320B	mg/L	150	99 J	110	0.06 UJ		180	250	160	130	210	71	100	82	82	350
Bicarbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	150	99	110	150	240	180	250	160	130	210	71	100	82	82	350
Carbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	5 U	5 U	5	U 150	5 L	J 5 I	U 5 U	5 U	5	U 5	U 5 U	J 5 U	5 U	5 U	5 U
Chloride	Anions, Ion Chromatography	MCAWW 300.0	mg/L															
Fluoride	Anions, Ion Chromatography	MCAWW 300.1	mg/L			_			-		-	_	-					
Hydroxide Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	5 U	5 U	5	U 5 U	5 L	J 5 I	J 5 U	5 U	5	U 5	0 5 0	J 5 U	5 U	5 U	5 U
Nitrate Nitrite as N	Nitrogen, Nitrate-Nitrite	MCAWW 353.2	mg/L	0.06 U	0.06 U	0.068	J 5 U	0.14 J	J 0.06 L	JJ 0.06 U	0.06 U	0.06	U 0.06	U 0.38	0.56 J	0.49	1.6	0.06 U
Sulfate	Anions, Ion Chromatography	MCAWW 300.2	mg/L															
Total Suspended Solids	Solids, Total Suspended (TSS)	SM 2540D	mg/L	2 U	7.6	2.2	UJ 8.8	2.2	J 8.2	2.2 U	2.2 U	2	U 20	4.4	2 U	2 U	2 U	8.6
Field Water Quality Parameters																		
Temperature	Field Measurement		Deg C	6.5	6.71	6.14	5.75	8.1	7.01	4.07	5.35	9.94	4.58	4.78	5.68	4.06	3.9	5.38
рН	Field Measurement		pH Units	7.02	6.32	7.26	2.32	6.28	6.98	7.1	6.8	6.53	7.12	6.65	6.51	6.82	6.47	6.67
Conductivity	Field Measurement		mS/cm	0.241	0.468	0.164	0.269	0.557	323	0.348	0.255	0.204	0.27	0.132	0.148	0.143	0.122	0.489
Turbidity	Field Measurement		NTU	2.71	10.88	0.7		0.48	15.58	0.52	6.18	1.68	31.94	30.52	4.44	1.4	4.58	8.26
Dissolved Oxygen	Field Measurement		mg/L	0.66	1	9.31	1.53	1.93	1.85	1.79	3.03	2.28	0.72	11.58	8.06	7.02	11.79	0.75
Oxidation-Reduction Potential	Field Measurement		mV	11.22	42.4	93.4	32.5	232.8	13.7	14.7	66.1	66.2	10.7	162.9	57.1	113.4	224.2	52.1

Key

μg/L = Micrograms per liter

ADEC = Alaska Department of Environmental Conservation

Deg C = Degrees Celsius.

EPA = United States Environmental Protection Agency

GC/MS = Gas Chromatography/Mass Spectrometry ICP/ MS = Inductively coupled plasma/mass spectrometry

J = The analyte was detected. The associated result is estimated.

mg/L = milligrams per liter

mS/cm = Millisiemens per centimeter

mV = Millivolts

ng/L = Nanograms per liter

NTU = Nephelometric turbidity units

U = The analyte was analyzed for but not detected. The value provided is the method detection limit.

UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Table 3-3. Groundwater Sample Results, Spring 2020

Table 3-3. Groundwater Sample	Station ID			MW51		MW52		MW53		MW54		MW55		MW56		MW57		MW58		MW5	9
Analyte	Geographic Area		Units	V	icinity/	of the Proposed	Repo	ository													
	Sample ID			0620MW510	3W	0620MW52GV	N	0620MW53G	iW	0620MW54GW		0620MW55GW	,	0620MW56GW		0620MW57G\	N/	0620MW58GW	v	0620MW5	59GW
	Method			002011111311	···	0020111113201		00201111330		00201111131011		3323		00201111130011		332311113731		332311113331		0020111113	
Aluminum	Metals (ICP)	SW846 6010B	μg/L	160	J	110	U	110	U	110	U	110	U	110	U	110	U	110	U	110	U
Antimony	Metals (ICP/MS)	SW846 6020A	μg/L	0.55	U	0.55	U	0.55	U	0.96	J	9.2	Ш	1.1	J	0.55	U	0.55	U	0.55	U
Arsenic	Metals (ICP/MS)	SW846 6020A	μg/L	3.9	J	7.8		1	U	46		25	Ш	1.2	J	1	U	2.3	J	63	
Barium	Metals (ICP/MS)	SW846 6020A	μg/L	37		10		140		130		110		82		4.6	J	100	Ш	330	
Beryllium	Metals (ICP/MS)	SW846 6020A	μg/L	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
Cadmium	Metals (ICP/MS)	SW846 6020A	μg/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Calcium	Metals (ICP)	SW846 6010B	μg/L	25000		13000		25000		43000		27000		49000		8100		30000		56000	
Chromium	Metals (ICP/MS)	SW846 6020A	μg/L	0.87	U	1.5	J	0.87	U	0.87	U	0.87	U	0.87	U	0.93	J	0.87	U	0.87	U
Cobalt	Metals (ICP/MS)	SW846 6020A	μg/L	0.85	J	0.53	J	0.2	U	1.2	J	6.6		1.8	J	0.2	U	0.36	J	1.2	J
Copper	Metals (ICP/MS)	SW846 6020A	μg/L	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
Iron	Metals (ICP)	SW846 6010B	μg/L	360	J	140	U	140	U	2600		20000		140	U	140	U	1500		1300	
Lead	Metals (ICP/MS)	SW846 6020A	μg/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Magnesium	Metals (ICP)	SW846 6010B	μg/L	22000		7300		14000		41000		19000		45000		4200		23000		54000	
Manganese	Metals (ICP/MS)	SW846 6020A	μg/L	95		33		43		320		1700		960		2.3	U	92		420	
Mercury	Mercury (CVAA)	SW846 7470A	μg/L	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
Nickel	Metals (ICP/MS)	SW846 6020A	μg/L	1	U	2.2	J	0.67	J	5.3	J	9.7	J	8.4	J	1.4	J	2	J	3.6	J
Potassium	Metals (ICP)	SW846 6010B	μg/L	410	U	410	U	410	U	550	J	760	J	540	J	410	U	440	J	690	
Selenium	Metals (ICP/MS)	SW846 6020A	μg/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Silver	Metals (ICP/MS)	SW846 6020A	μg/L	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U
Sodium	Metals (ICP)	SW846 6010B	μg/L	770	J	2900		2300		2100		6100		470	J	2600		1800	J	1800	
Thallium	Metals (ICP/MS)	SW846 6020A	μg/L	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
Vanadium	Metals (ICP/MS)	SW846 6020A	μg/L	3.3	J	4.1	J	4.1	J	3	J	3.4	J	2.5	J	3.1	J	3.3	J	3.1	J
Zinc	Metals (ICP/MS)	SW846 6020A	μg/L	9.5	U	9.5	U	9.5	U	9.5	U	9.5	U	9.5	U	9.5	U	80		28	J
Total Low Level Mercury														'							
Mercury	Total Mercury by EPA 1631	EPA 1631	ng/L	18.7		41.7		31.9		10.1		92.5		39.8		37.0		2.29		21.5	
Dissolved Low Level Mercury														,							
Mercury	Dissolved Mercury by EPA 1631	EPA 1631	ng/L	2.90		7.23		9.72		0.23	J	45.1		6.56		16.0		0.57		10.8	
General Chemistry			<u> </u>																		
Alkalinity	Alkalinity	SM 2320B	mg/L	110		51	J	99		230		120		280		35		150		290	
Bicarbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	110		51	J	99		230		120	\Box	280		35		150	\Box	290	
Carbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	5	U	5	U		U		U		U		U	5	U		U	5	U
Chloride	Anions, Ion Chromatography	MCAWW 300.0	mg/L																		
Fluoride	Anions, Ion Chromatography	MCAWW 300.1	mg/L										\Box						Н		
Hydroxide Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Nitrate Nitrite as N	Nitrogen, Nitrate-Nitrite	MCAWW 353.2	mg/L	0.06	U	1.6		0.11	J	0.06	U	0.06	U	0.29		0.15		0.06	U	0.06	U
Sulfate	Anions, Ion Chromatography	MCAWW 300.2	mg/L										\vdash						\Box		
Total Suspended Solids	Solids, Total Suspended (TSS)	SM 2540D	mg/L	2.7		2.6		2	U	4		39	\vdash	10		2	U	2	U	6.2	
Field Water Quality Parameters			O,											1							
Temperature	Field Measurement		Deg C	5.04		4.58		3.64		5.85		4.75	П	4.26		4.17		7.49	П	6.91	
рН	Field Measurement		pH Units	6.7		6.22		6.57		6.67		5.93		6.89		6.21		7.42	П	6.31	
Conductivity	Field Measurement		mS/cm	0.18	\dashv	0.22	+	0.135	+	0.338		0.238	++	0.334	+	0.55		0.23	H	0.432	+
Turbidity	Field Measurement Field Measurement		MS/CM NTU	10.73	+	8.03	+	1.46	+	3.44	\vdash	31.48	++	5.11	+	0.55	\vdash	2.49	\vdash	6.12	+
· · · · · · · · · · · · · · · · · · ·	Field Measurement Field Measurement			5.56	+	10.34	+	7.97	+	1.56	\vdash	1.14	++		+		\vdash	1.22	\vdash	3.57	+
Dissolved Oxygen Oxidation-Reduction Potential	Field Measurement Field Measurement		mg/L		+		+	50.6	+	65.9	\vdash		+	3.3	+	11.09	\vdash	21.6	+		+
TOMOROUS REQUESTION POTENTIAL	THEIR INIEGSULETHETIL	I	mV	155.1	- 1 1	119.3	1 1	ט.טכ	- 1 - 1	טס.א	1	61.2	1 1	72		211.5	1	L 21.0	1 1	85	

Key

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able	3-4.	Surface	Water	Sample	Results	Spring	2020	
abic	J- -	Juliace	vvatei	Jailipie	nesuits,	JUILIE	2020	

	Station ID				Wate	er Quality Compariso	n Criteria		RD10		RD15		RD05		RD06		RD08	
	Geographic Are	ea			National	National	Alaska Water	Alaska Water Quality	Red Devil Cre	ek	Red Devil Cre	ek	Seep		Red Devil Cre	eek	Red Devil Cr	eek
Analyte	Sample ID Method		Units	Hardness- Dependent Aquatic Life Water Quality Criterion	National Recommended Water Quality Criteria; Fresh Water; Aquatic Life Criteria; CMC - Acute (1)	Recommended Water Quality Criteria; Fresh Water; Aquatic Life Criteria; CCC - Chronic (2)	Quality Criteria for Toxics and Other Deleterious Substances; Aquatic Life for Fresh Water; Acute - CMC (3)		0620RD10S\	N	0620RD15S\	N	0620RD05S	w	0620RD06S\	w	0620RD085	SW
Total Inorganic Elements																		
Aluminum	Metals (ICP)	SW846 6010B	μg/L						110	U	110	U	110	U	110	U	110	U
Antimony	Metals (ICP/MS)	SW846 6020A	μg/L						2.2	J	40		43		170	\bot	210	
Arsenic	Metals (ICP/MS)	SW846 6020A	μg/L						1.4	J	14		970		84	\perp	81	
Barium	Metals (ICP/MS)	SW846 6020A	μg/L						23		25		99		30	\perp	32	
Beryllium	Metals (ICP/MS)	SW846 6020A	μg/L						0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
Cadmium	Metals (ICP/MS)	SW846 6020A	μg/L						0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Calcium	Metals (ICP)	SW846 6010B	μg/L						18000		17000		41000		19000	\perp	19000	
Chromium	Metals (ICP/MS)	SW846 6020A	μg/L						0.87	U	0.87	U	0.87	U	0.87	U	0.87	U
Cobalt	Metals (ICP/MS)	SW846 6020A	μg/L						0.2	U	0.2	U	4		0.34	J	0.2	J
Copper	Metals (ICP/MS)	SW846 6020A	μg/L						3	U	3	U	3	U	3	U	3	U
Iron	Metals (ICP)	SW846 6010B	μg/L						140	U	140	U	2200		170	J	140	U
Lead	Metals (ICP/MS)	SW846 6020A	μg/L						1	U	1	U	1 45000	U	1 1 1 2 2 2 2 2	U	1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	U
Magnesium	Metals (ICP)	SW846 6010B	μg/L						9800	+	9600		45000		12000	+	12000	_
Manganese Marcury	Metals (ICP/MS) Mercury (CVAA)	SW846 6020A SW846 7470A	μg/L						8.5 0.15	J	0.26	+	270 0.15	+	33 0.22	+++	0.17	J
Mercury Nickel	Metals (ICP/MS)	SW846 7470A SW846 6020A	μg/L μg/L						0.15	U	0.26	IJ	16	U	1.2	J	1.1) J
Potassium	Metals (ICP)	SW846 6020A SW846 6010B	μg/L μg/L						410	U	410	U	1200	+++	410	U	410	U
Selenium	Metals (ICP/MS)	SW846 6010B	μg/L μg/L						10	U	10	U	10) J	10	U	10	U
Silver	Metals (ICP/MS)	SW846 6020A	μg/L μg/L		 				0.28	U	0.28	U	0.28	U	0.28	111	0.28	U
Sodium	Metals (ICP)	SW846 6010B	μg/L μg/L						990	1	1500	1	10000	+ +	1400	+ + +	2000	+
Thallium	Metals (ICP/MS)	SW846 6020A	μg/L μg/L		 				0.33	,	0.33	IJ	0.33	11	0.33	IJ	0.33	U
Vanadium	Metals (ICP/MS)	SW846 6020A	μg/L μg/L						3.2	J	3.3	1	2.6	1	3.1	1	3.4	J
Zinc	Metals (ICP/MS)	SW846 6020A	μg/L						9.5	U	9.5	U	9.5	U	9.5	U	9.5	U
Total Low Level Mercury	ivicturs (ref / ivis)	3470-10 002074	M9/ -						3.3	Ü	3.3	Ü	3.3		3.3	10	3.3	
	Total Mercury by EPA 1631	EPA 1631	ng/l						4.9	T	448		43		550	\top	462	$\overline{}$
Mercury	Total Mercury by EFA 1631	EPA 1031	ng/L						4.9		440		43		330		402	_
Dissolved Inorganic Elements	Martin (ICD) (DICCOLLIED)	SIMPAC COAOD	/1	I	750	07	750	0.7	110	T	110		110	T T	110		110	
Antimony	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L		750	87	750	87	110	U	110	U	110	U	110	U	110	U
Antimony	Metals (ICP/MS) (DISSOLVED)	SW846 6020A SW846 6020A	μg/L		340	150	340	150	2.2	J	39		30 840		170 73	+++	210 75	+
Arsenic Barium	Metals (ICP/MS) (DISSOLVED) Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L μg/L		340	150	340	150	1.1 24	J	12 23		100		30	+	32	+
Beryllium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						0.36	U	0.36	U	0.36	11	0.36	+ 11	0.36	U
Cadmium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	1.7	0.67	1.9	0.23	0.5	U	0.5	U	0.5	11	0.5	+ 11	0.5	U
Calcium	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	11 (3)(0)	1.7	0.07	1.9	0.23	18000	J	17000	+ 0 +	43000		19000	+++	19000	
Chromium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	531	69	531	69	0.9	1	0.87	11	0.87	U	0.87	+ 11	0.87	U
Cobalt	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	11 (5)(6)	331	03	331	03	0.2	U	0.2	U	3.7		0.26	+++	0.2	J
Copper	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)(7)			12	8.3	3	U	3	U	3.7	ш	3	U	3	U
Iron	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	11 (3)(0)(7)		1000		1000	140	U	140	U	1900		140	+ 11	140	U
Lead	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	59	2.3	59	2.3	1	U	1	U	1	U	1	U	1	U
Magnesium	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	(5)(5)					10000	J	9700	+ +	47000	-	12000	+++	13000	+
Manganese	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						7	J	15		280		31	+	24	+
Mercury	Mercury (CVAA) (DISSOLVED)	SW846 7470A	μg/L		1.4	0.77	1.4	0.77	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
Nickel	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	435	48	435	48	1.5	J	0.81	J	16		1.5	J	1.5	J
Potassium	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	, ,, ,					410	U	410	U	1100	J	410	U	410	U
Selenium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						10	U	10	U	10	U	10	U	10	U
Silver	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)	2.8		2.8	_	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U
Sodium	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	. ,					2000		1900	J	11000		2600	\top	2700	
Thallium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
Vanadium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						2.6	J	2.5	J	2.3	U	2.3	J	2.4	J
Zinc	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	108.9	109.7	108.9	109.7	9.5	U	9.5	U	9.5	U	9.5	U	9.5	U
Dissolved Low Level Mercury																		
Mercury	Dissolved Mercury by EPA 1631	EPA 1631	ng/L		1400	770	1400	770	3.13		16.7		5.45		26.7		52.3	
General Chemistry						_							_					
Alkalinity	Alkalinity	SM 2320B	mg/L						70		67		250		76	\top	81	\top
Bicarbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L						70	+	67		250	+	76	+	81	+
Carbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L						5	U	5	U	5	U	5	U	5	U
Chloride	Anions, Ion Chromatography	MCAWW 300.0	mg/L		860	230	860	230										
Fluoride	Anions, Ion Chromatography	MCAWW 300.0	mg/L															
Hydroxide Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L						5	U	5	U	5	U	5	U	5	U
Nitrate Nitrite as N	Nitrogen, Nitrate-Nitrite	MCAWW 353.2	mg/L						0.082	J	0.095	J	0.06	UJ	0.078	J	0.088	J
Sulfate	Anions, Ion Chromatography	MCAWW 300.0	mg/L															
Total Dissolved Solids	Solids, Total Dissolved (TDS)	SM 2540C	mg/L			20		20	10	UJ	10	UJ	22	J	10	UJ	58	J
Total Organic Carbon	Organic Carbon, Total (TOC)	SW846 9060	mg/L						1.6	J	1.6	J	1.3	J	1.4	J	1.4	J
Total Suspended Solids	Solids, Total Suspended (TSS)	SM 2540D	mg/L						2.2	UJ	2.2	UJ	2.2	UJ	2.2	UJ	2.2	UJ
Hardness	Hardness as CaCO3	Calculated	mg/L						86.2		82.5		301.1		96.9		101.1	
Field Water Quality Parameters																		
Temperature	Field Measurement		Deg C						10.84		9.77		3.58		8.31		8.39	
oH	Field Measurement		pH Units			6.5 - 9.0		6.5 - 8.5	7.79		7.88		6.9		7.55		7.79	
Conductivity	Field Measurement		mS/cm						0.117		0.112		0.327		0.129		0.129	
			NITTI						1.13	T	0.55		10.08		0.42		0.88	
Turbidity	Field Measurement		NTU						1.15		0.55		10.08		0.43		0.00	
Turbidity Dissolved Oxygen	Field Measurement Field Measurement		mg/L					≥ 4	11.13		11.85		9.2		13.89		15.25 227.2	士

μg/L = Micrograms per liter

(1) USEPA. 2016. National Recommended Water Quality Criteria - Aquatic Life Criteria. Accessed on May 9, 2017 at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#table ADEC = Alaska Department of Environmental Conservation (2) USEPA. 2016. National Recommended Water Quality Criteria - Aquatic Life Criteria. Accessed on May 9, 2017 at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#table

(3) ADEC. 2008. Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (as amended through December 12, 2008). ADEC, Anchorage, Alaska

(4) ADEC. 2008. Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (as amended through December 12, 2008). ADEC, Anchorage, Alaska

(5) Calculated total hardness as CaCO3 = Calcium Hardness (mg/L as CaCO3) + Magnesium Hardness (mg/L as CaCO3)

(6) Hardness-adjusted criterion value was calculated following EPA 2016 and ADEC 2008. A total hardness value of 91.7 mg/L as CaCO3, based on the average value for Red Devil Creek surface water samples, is assumed.

EPA = United States Environmental Protection Agency (7) As of 2017 the USEPA no longer considers copper to be hardness-dependent. GC/MS = Gas Chromatography/Mass Spectrometry

ICP/ MS = Inductively coupled plasma/mass spectrometry J = The analyte was detected. The associated result is estimated. "+" indicates high bias and "-" indicates low bias.

mg/L = milligrams per liter

mS/cm = Millisiemens per centimeter

CCC = Criteria Continuous Concentration

CMC = Criteria Maximum Concentration

mV = Millivolts

ng/L = Nanograms per liter NTU = Nephelometric turbidity units

Bold = Detected

Deg C = Degrees Celsius.

U = The analyte was analyzed for but not detected. The value provided is the method detection limit.

UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Shading = Sample concentration exceeds one or more WQC value.

H = Hardness-dependent water quality criterion for aquatic life.

Table 3-5. Groundwater Sample Results, Fall 2020

Station ID			MW10	MW16	MW17	MW06	MW	27	MW28	MW40	MW42	MW43	MW44	MW45	MW46
Geographic Area Sample ID		Units		Post-1955 MPA	Pre-1955 MPA										
			0920MW10GW	0920MW16GW	0920MW17GW	0920MW06GW	0920MW	/27GW	0920MW28GW	0920MW40GW	0920MW42GW	0920MW43GW	0920MW44GW	0920MW45GW	0920MW46GW
	CM/04C CO10D	/1	110	020	110	110	110	1.1	800	110	110	110	210	220	240
						7		U							J 240 J J 0.55 U
						/ /F									J 1 U
							_								J 5.2 J
								- 11							J 0.36 U
															J 0.5 U
					0.0										18000
							_	,							J 1.1 J
							_								J 0.25 J
								- 11	3.2	20	2 11	2 11			J 3 U
				0 3	0 3			11	2200	500	460 L	2900		3	J 270 J
, ,			1				_	11	1 11	1 11	1 11	1 11			J 1 U
			30000	<u> </u>	<u> </u>)	31000	47000	30000	18000			22000
` '															19
															J 0.15 U
				11 7											J 1.1 J
				1 2300				1							J 490 J
` '							_	U							J 10 U
								U							J 0.28 U
					0.20		_								J 1100 J
` '															U 0.33 U
							_								J 4 J
								J							J 9.5 U
come (ver / vive)	0110100000	P-0/ -			5.0				5.5	5.0	3.0		0.0	0.0	3.5
Total Mercury by EPA 1631	EPA 1631	ng/L	175	1850	89.7	1.76	651		1220	2.37	63.4	1.52	13.5	25.1	17.2
										-				-	
Dissolved Mercury by EPA 1631	EPA 1631	ng/L	68.9	842	13.4	0.29	J 503		563	0.26 J	32.1	0.30 J	7.09	6.97	1.05
, , ,		O/													
Alkalinity	SM 2320B	mg/L	160	100	120	170	260		190	260	190	120	200	110	120
•															120
								U	5 U	5 U	5 U	5 U			U 5 U
,				1.3	0.14 U				0.14 U.	1.1	0.97	1.1			1.1
			0.03			J 0.21			0.03 U	0.03 U	0.063 J	0.03 U			U 0.03 U
Alkalinity			5				_	U	5 U	5 U	5 U	5 U			U 5 U
Nitrogen, Nitrate-Nitrite	MCAWW 353.2	mg/L	0.06	U 0.06	U 0.06 L			U	0.06 U.	J 0.06 U	0.06 U	0.06 U	0.06 U	0.49	0.43
Anions, Ion Chromatography	MCAWW 300.2	mg/L	9.4	290	9.4	42	170		46 J	11	22	14	6.7	4.8	3.9
Solids, Total Suspended (TSS)	SM 2540D	mg/L	2.5	35	2 l	4.8	2	U	16	2 U	2	3.6	11	2.6	4
•							•	•				•			
Field Measurement		Deg C	4.72	6.89	5.59	4.67	6.1		5.42	3.71	4.87	6.09	3.36	3.51	2.75
Field Measurement		pH Units	7.31	6.21	6.88	6.11	6.25		6.86	7	6.81	6.46	8	6.42	6.62
Field Measurement		mS/cm	0.232				0 574			0.354		0.168	0.234		0.132
															8.84
		mg/L	11.33	2.55	8.26	0.15	1.53		0.45	0.65	2.75	0.67	4.74	8.26	4.87
Field Measurement															
	Sample ID Method Metals (ICP) Metals (ICP/MS) Metals	Sample ID	Metals (ICP/MS) SW846 6010B µg/L	Metals (ICP)	Metals (ICP)	Sample ID	Company Comp	Content Cont	Control Cont	Considerable Cons	Contraction Contraction	Comparison Com	Control of Control o	Secretary Secr	Congress of the Congress of

Key

μg/L = Micrograms per liter

ADEC = Alaska Department of Environmental Conservation

Deg C = Degrees Celsius.

EPA = United States Environmental Protection Agency

GC/MS = Gas Chromatography/Mass Spectrometry ICP/ MS = Inductively coupled plasma/mass spectrometry

J = The analyte was detected. The associated result is estimated.

mg/L = milligrams per liter

mS/cm = Millisiemens per centimeter

mV = Millivolts

ng/L = Nanograms per liter

NTU = Nephelometric turbidity units

U = The analyte was analyzed for but not detected. The value provided is the method detection limit.

UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Note

(1) Table 3-5 in the 2019 Baseline Monitoring Report has been revised to include corrected laboratory data. Refer to the Red Devil Mine 2019 Baseline Monitoring Report – Fall 2019 Analytical Data Correction Memo in the Administrative Record for corrected fall 2019 data.

Table 3-5. Groundwater Sample Results, Fall 2020

Table 3-5. Groundwater Sample	Station ID			MW47	MW48	MW50	MW51	MW52	MW53	MW54	MW55	MW56	MW57	MW58	MW59		
Analyte	Geographic Area		Units	Vicinity of the Proposed Repository													
	Sample ID			0920MW47GW	0920MW48GW	0920MW50GW	0920MW51GW	0920MW52GW	/ 0920MW53GW	v 0920MW54GW	0920MW55GW	0920MW56GW	0920MW57GW	0920MW58GW	0920MW59GW		
	Method																
Aluminum	Metals (ICP)	SW846 6010B	μg/L		U 110 L	840 J	170 J		J 110	U 110 L	J 110 U	150 5	110 U		110 J		
Antimony	Metals (ICP/MS)	SW846 6020A	μg/L	0.55	U 0.55 L	12	0.55 U	3	J 0.55	U 0.55 J	J 6.5 U	0.55 U	0.55 U	0.55 U	0.55 U		
Arsenic	Metals (ICP/MS)	SW846 6020A	μg/L	1	U 1 U	530	5.1	22	1	U 42	19	1.8 J	1.3 J	2.5 J	62		
Barium 	Metals (ICP/MS)	SW846 6020A	μg/L	1.9	J 55	310	44	150	160	140	120	61	8.2	110	330		
Beryllium	Metals (ICP/MS)	SW846 6020A	μg/L	0.36	U 0.36 L	0.36 U	0.36 U	0.36	U 0.36	U 0.36 L	J 0.36 U	0.36 U	0.36 U	0.36 U	0.36 U		
Cadmium	Metals (ICP/MS)	SW846 6020A	μg/L	0.5	U 0.5 L	0.5 U	0.5 U	0.5	U 0.5	U 0.5 L	J 0.5 U	0.5 U	0.5	0.5 U	0.5 U		
Calcium	Metals (ICP)	SW846 6010B	μg/L	21000	20000	72000	27000	38000	27000	44000	31000	50000	14000	28000	56000		
Chromium	Metals (ICP/MS)	SW846 6020A	μg/L	1.9	J 7.3	3.1 J	0.98 J	2.6	J 12	15	1.7 J	1.2 J	1.2 J	0.94 J	1.2 J		
Cobalt	Metals (ICP/MS)	SW846 6020A	μg/L	0.2	U 0.2 L	3.3	1 J	13	0.47	J 1.4 J	J 2.4	2.5	0.2 U	0.37 J	1 J		
Copper	Metals (ICP/MS)	SW846 6020A	μg/L	3	U 3 L	3 U	3 0	3	U 3	U 3	J 3 U	3 U	3 U	3 U	3 0		
Iron	Metals (ICP)	SW846 6010B	μg/L	140	U 140 L	1900	410 J	560	140	U 2600	8100	140 U	140 U	1800	1400		
Lead	Metals (ICP/MS)	SW846 6020A	μg/L	1	U 1 L	1 U	1 U	1	U 1	U 1 L	J 1 U	1 U	1 0	1 U	1 U		
Magnesium	Metals (ICP)	SW846 6010B	μg/L	22000	19000	59000	23000	32000	16000	41000	24000	43000	8600	22000	52000		
Manganese	Metals (ICP/MS)	SW846 6020A	μg/L	78	12	980	110	940	86	380	720	1000	5.1 J	100	400		
Mercury	Mercury (CVAA)	SW846 7470A	μg/L	0.15	U 0.15 L	1.5	0.15 U	-	U 0.15	U 0.15 L	J 0.15 U	0.15 U	0.13	0.15 U	0.15 U		
Nickel	Metals (ICP/MS)	SW846 6020A	μg/L	0.62	U 1 J	9.4 J	1.2 J	25	1.4	J 7.3 J	J 5.6 J	7.2 J	2.4 J	2.5 J	3.2 J		
Potassium	Metals (ICP)	SW846 6010B	μg/L	440	J 440 J	860 J	410 U	660	J 410	U 600 J	J 630 J	530 J	410 U	500 J	710 J		
Selenium	Metals (ICP/MS)	SW846 6020A	μg/L	10	U 10 L	10 U	10 U	10	U 10	U 10 L	J 10 U	10 U	10 U		10 U		
Silver	Metals (ICP/MS)	SW846 6020A	μg/L	0.20	U 0.28 L	0.28 U	0.28 U	0.00	U 0.28	U 0.28 L	J 0.28 U	0.28 U	0.20	0.28 U	0.28 U		
Sodium	Metals (ICP)	SW846 6010B	μg/L	2100	1700 J	2300	2100	2600	2200	1900	J 2600	1400 J	2400	1500 J	1700 J		
Thallium	Metals (ICP/MS)	SW846 6020A	μg/L	0.33	U 0.33 L	0.33 U	0.33 U	0.33	U 0.33	U 0.33 L	J 0.33 U	0.33 U	0.33 U	0.33 U	0.33 U		
Vanadium	Metals (ICP/MS)	SW846 6020A	μg/L	4.2	J 3.3 J	4 J	4.3 J	3.9	J 4.1	J 2.6 J	J 2.9 J	2.7 J	4 J	3 J	2.7 J		
Zinc	Metals (ICP/MS)	SW846 6020A	μg/L	9.5	U 9.5 L	9.5 U	9.5 U	9.5	U 9.5	U 9.5 L	J 9.5 U	9.5 U	9.5 U	9.5 U	9.5 U		
Total Low Level Mercury																	
Mercury	Total Mercury by EPA 1631	EPA 1631	ng/L	0.34	J 4.79	1680	7.74	131	71.2	3.50	38.1	27.6	38.7	15.8	19.2		
Dissolved Low Level Mercury																	
Mercury	Dissolved Mercury by EPA 1631	EPA 1631	ng/L	2.81	3.07	240	1.12	4.85	11.8	0.14 l	J 25.7	1.20	14.4	0.59 J	3.48		
General Chemistry																	
Alkalinity	Alkalinity	SM 2320B	mg/L	120	110	360	140	200	110	240	160	260	60	140	300		
Bicarbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	120	110	360	140	200	110	240	160	260	60	140	300		
Carbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	5	U 5 L	5 U			U 5	U 5 L	J 5 U	5 U	5 U	5 U	5 U		
Chloride	Anions, Ion Chromatography	MCAWW 300.0	mg/L	1.2	0.14 L	1.2	0.95	0.99	1.3	0.96	0.14 U	0.96	1.1	0.81 J	1.2		
Fluoride	Anions, Ion Chromatography	MCAWW 300.1	mg/L	0.03	U 0.14 J	0.03 U	0.03 U	0.03	U 0.03	U 0.22	0.076 J	0.12 J	0.13 J	0.063 J	0.03 U		
Hydroxide Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L	5	U 5 L	5 U	5 U	5	U 5	U 5 L	J 5 U	5 U	5 U	5 U	5 U		
Nitrate Nitrite as N	Nitrogen, Nitrate-Nitrite	MCAWW 353.2	mg/L	0.27	1.2 J	0.06 U	J 0.06 U	0.21	0.1	J 0.06 L	J 0.06 U	0.59	0.15	0.06 U	0.06 U		
Sulfate	Anions, Ion Chromatography	MCAWW 300.2	mg/L	4.5	4 J	8.5	2.2	5.7	5	9.7	8	5.5	3.9	8.9	5.6		
Total Suspended Solids	Solids, Total Suspended (TSS)	SM 2540D	mg/L	2	U 2 L	22	4.2	19	4.8	3.2	7	5.8	2 U	4.6	6.8		
Field Water Quality Parameters																	
Temperature	Field Measurement		Deg C	2.89	4.15	3.9	4.11	3.64	5.44	3.55	3.44	3.8	3.27	4.41	5.64		
ρΗ	Field Measurement		pH Units	6.48	6.22	6.62	6.72	6.44	8.25	7.02	6.1	6.66	6.32	7.41	6.97		
Conductivity	Field Measurement	+	mS/cm	0.14	0.132	0.388	0.165	0.392	0.146	0.272	0.199	0.287	0.076	0.176	0.363		
Turbidity	Field Measurement		NTU	1.53	0.51	22.03	7.72	37.21	4.91	2.92	2.09	7.51	3.05	9.07	9.48		
Dissolved Oxygen	Field Measurement	+	mg/L	5.44	5.26	3.6	4.42	10.78	4.99	10.86	7.9	1.38	6.81	2.05	4.2		
Oxidation-Reduction Potential	Field Measurement		mV	341.8	266.9	51.2	193.5	299.4	37.3	-7.3	57.5	295.6	181.4	-33.8	-16.1		
OAIGATION-NEGUCTION FOLEMENT	ו וכוע ועוכמגעו כווופוונ		IIIV	341.0	200.9	31.2	153.3	233.4	37.3	-1.5	31.3	233.0	101.4	-33.0	-10.1		

Key

μg/L = Micrograms per liter

ADEC = Alaska Department of Environmental Conservation

Deg C = Degrees Celsius.

EPA = United States Environmental Protection Agency

GC/MS = Gas Chromatography/Mass Spectrometry ICP/ MS = Inductively coupled plasma/mass spectrometry

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U = The analyte was analyzed for but not detected. The value provided is the method detection limit.

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Note

(1) Table 3-5 in the 2019 Baseline Monitoring Report has been revised to include corrected laboratory data. Refer to the Red Devil Mine 2019 Baseline Monitoring Report – Fall 2019 Analytical Data Correction Memo in the Administrative Record for corrected fall 2019 data.

	Station ID Geographic Area Sample ID Analyte Method				Water Quality Comparison Criteria						RD15	RD05	RD06	RD08
									Red Devil Creek		Red Devil Creek		Red Devil Creek	Red Devil C
			Units	Hardness- Dependent Aquatic Life Water Quality Criterion	National Recommended Water Quality Criteria; Fresh Water; Aquatic Life Criteria; CMC - Acute (1)	National Recommended Water Quality Criteria; Fresh Water; Aquatic Life Criteria; CCC - Chronic (2)	Alaska Water Quality Criteria for Toxics and Other Deleterious Substances; Aquatic Life for Fresh Water; Acute - CMC (3)	Alaska Water Quality Criteria for Toxics and Other Deleterious Substances; Aquatic Life for Fresh Water; Chronic - CCC (4)	0920RD10SW	ı	0920RD15SW	0920RD05SW	0920RD06SW	0920RD08
otal Inorganic Elements	Motols (ICD)	SW846 6010B	/1	I	<u> </u>				110		110	110	110	110
luminum ntimony	Metals (ICP) Metals (ICP/MS)	SW846 6010B SW846 6020A	μg/L						2.0	U	110 40	U 110 J 25	U 110 220	U 110 280
rsenic	Metals (ICP/MS)	SW846 6020A	μg/L						1.5	J	14	1200	94	100
rium	Metals (ICP/MS)	SW846 6020A	μg/L μg/L						27	J	29	110	38	39
eryllium	Metals (ICP/MS)	SW846 6020A	μg/L μg/L						0.36	U		U 0.36	U 0.36	U 0.36
admium	Metals (ICP/MS)	SW846 6020A	μg/L μg/L						0.5	U			U 0.5	U 0.5
lcium	Metals (ICP)	SW846 6010B							22000	U	22000	44000	24000	24000
nromium	Metals (ICP/MS)	SW846 6020A	μg/L μg/L						1.5			U 0.87	U 2.4	J 1.6
obalt	Metals (ICP/MS)	SW846 6020A	μg/L						0.2	U		U 4.7	0.25	J 0.2
opper	Metals (ICP/MS)	SW846 6020A	μg/L						3	U		U 3	U 3	U 3
on opper	Metals (ICP)	SW846 6010B	μg/L						140	U	210	J 3100	260	J 150
ead	Metals (ICP/MS)	SW846 6020A	μg/L						1	U				U 1
/lagnesium	Metals (ICP)	SW846 6010B	μg/L						12000		12000	46000	14000	15000
langanese	Metals (ICP/MS)	SW846 6020A	μg/L						12		25	320	39	19
1ercury	Mercury (CVAA)	SW846 7470A	μg/L						0.15	U			U 0.22	J 0.18
ickel	Metals (ICP/MS)	SW846 6020A	μg/L						0.62	U		U 18		J 1.1
otassium	Metals (ICP)	SW846 6010B	μg/L						410	U		U 1200	J 410	U 410
elenium	Metals (ICP/MS)	SW846 6020A	μg/L						10	U		U 10	U 10	U 10
ilver	Metals (ICP/MS)	SW846 6020A	μg/L						0.28	U		U 0.28	U 0.28	U 0.28
odium	Metals (ICP)	SW846 6010B	μg/L						1800	j	1900	J 11000	2900	2900
hallium	Metals (ICP/MS)	SW846 6020A	μg/L						0.33	U			U 0.33	U 0.33
'anadium	Metals (ICP/MS)	SW846 6020A	μg/L						2.8	J	4.2		U 2.5	J 2.5
inc	Metals (ICP/MS)	SW846 6020A	μg/L						9.5	U				U 9.5
otal Low Level Mercury	interest (i.e. j. inter	0110100001	P0/ -						0.0	•	5.5	0 0.0	0 0.0	0 0.0
ercury	Total Mercury by EPA 1631	EPA 1631	ng/L						5.25		152	47.0	308	379
	Total Mercury by EPA 1031	CPA 1031	lig/L						5.25		132	47.0	306	3/9
ssolved Inorganic Elements	14 + 1 (ICP) (DISCOLVED)	CINO 4 C CO4 OP	/1		750	0.7	750	07	440		440	110	110	110
uminum	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L		750	87	750	87	110	U		_		U 110
ntimony	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L		240	450	240	450	4.5	U	40	35	U 230	280
rsenic	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L		340	150	340	150	2.0	J	13	1100	89	96
arium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						27	- 11	29	110	37	38
eryllium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A SW846 6020A	μg/L	11 (5)(6)	2.0	0.77	2.2	0.26	0.36 0.5	U		U 0.36 U 0.5	U 0.36	U 0.36 U 0.5
admium alcium	Metals (ICP/MS) (DISSOLVED) Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	H (5)(6)	2.0	0.77	2.2	0.20	22000	U	22000	44000	U 0.5 23000	23000
	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	615	80	615	80	0.87	U		U 0.87	U 0.87	U 0.87
hromium		SW846 6020A SW846 6020A	μg/L	п (э)(ө)	012	80	012	80	0.87				0.21	J 0.2
obalt	Metals (ICP/MS) (DISSOLVED) Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)(7)			15	9.7	3	U		U 4.1 U 3		U 3
copper	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L μg/L	H (3)(0)(7)		1000		1000	140	U	_	U 2900	140	U 140
ead	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	71	2.8	71	2.8	1	U				U 1
/lagnesium	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	11 (5)(6)	71	2.0	71	2.0	12000		12000	47000	14000	14000
Manganese	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						9.7	1	23	310	35	17
Mercury	Mercury (CVAA) (DISSOLVED)	SW846 7470A	μg/L		1.4	0.77	1.4	0.77	0.15	U		U 0.15	U 0.15	U 0.15
lickel	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	507	56	507	56	0.62	U	0.64	J 13		J 0.96
otassium	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	(5)(5)	00.		30.		410	U		U 1200	J 420	J 410
elenium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						10	U		U 10	U 10	U 10
ilver	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)	3.8		3.8		0.28	U			U 0.28	U 0.28
odium	Metals (ICP) (DISSOLVED)	SW846 6010B	μg/L	` ′					2000		2100	12000	2900	2900
hallium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						0.33	U				U 0.33
anadium	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L						2.3	U		U 2.3	U 2.3	U 2.3
inc	Metals (ICP/MS) (DISSOLVED)	SW846 6020A	μg/L	H (5)(6)	126.9	127.9	126.9	127.9	9.5	U		U 9.5	U 9.5	U 9.5
issolved Low Level Mercury														
1ercury	Dissolved Mercury by EPA 1631	EPA 1631	ng/L		1400	770	1400	770	4.22		21.6	2.77	150	32.0
General Chemistry	· · · · · · · · · · · · · · · · · · ·				-									
Ikalinity	Alkalinity	SM 2320B	mg/L						85		86	250	95	88
icarbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L						85	\vdash	86	250	95	88
arbonate Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L						5	U			U 5	U 5
hloride	Anions, Ion Chromatography	MCAWW 300.0	mg/L		860	230	860	230	0.14	U		U 0.8	J 0.78	J 0.14
luoride	Anions, Ion Chromatography	MCAWW 300.0	mg/L						0.1	J	0.13	J 0.072	J 0.11	J 0.13
ydroxide Alkalinity as CaCO3	Alkalinity	SM 2320B	mg/L						5	U		U 5	U 5	U 5
itrate Nitrite as N	Nitrogen, Nitrate-Nitrite	MCAWW 353.2	mg/L						0.06	U	0.074		U 0.06	U 0.06
ılfate	Anions, Ion Chromatography	MCAWW 300.0	mg/L						9.6		10	9.1	13	13
otal Dissolved Solids	Solids, Total Dissolved (TDS)	SM 2540C	mg/L			20		20	71		87	240	110	49
otal Organic Carbon	Organic Carbon, Total (TOC)	SW846 9060	mg/L						3.5			U 0.38	U 3.3	3.2
otal Suspended Solids	Solids, Total Suspended (TSS)	SM 2540D	mg/L						2	U			U 2.2	U 2
ardness	Hardness as CaCO3	Calculated	mg/L						104.44		104.44	303.64	115.18	115.18
eld Water Quality Parameters				_										_
emperature	Field Measurement		Deg C						8.46		8.43	3.58	7.83	7.79
 H	Field Measurement		pH Units			6.5 - 9.0		6.5 - 8.5	7.78		7.84	6.89	7.63	7.77
onductivity	Field Measurement		mS/cm						0.154		0.152	0.373	172	0.169
urbidity	Field Measurement		NTU							\vdash				
issolved Oxygen	Field Measurement		mg/L					≥ 4	11.15		11.69	4.03	11.66	12.04
xidation-Reduction Potential	Field Measurement		mV						151.7		61.5	13.6	142.7	276.2

μg/L = Micrograms per liter

ADEC = Alaska Department of Environmental Conservation **Bold** = Detected

CCC = Criteria Continuous Concentration CMC = Criteria Maximum Concentration

Deg C = Degrees Celsius.

EPA = United States Environmental Protection Agency GC/MS = Gas Chromatography/Mass Spectrometry

H = Hardness-dependent water quality criterion for aquatic life.

ICP/ MS = Inductively coupled plasma/mass spectrometry

J = The analyte was detected. Associated result is estimated. "+" indicates high bias and "-" indicates low bias. mg/L = milligrams per liter

mS/cm = Millisiemens per centimeter

NTU = Nephelometric turbidity units

mV = Millivolts

ng/L = Nanograms per liter

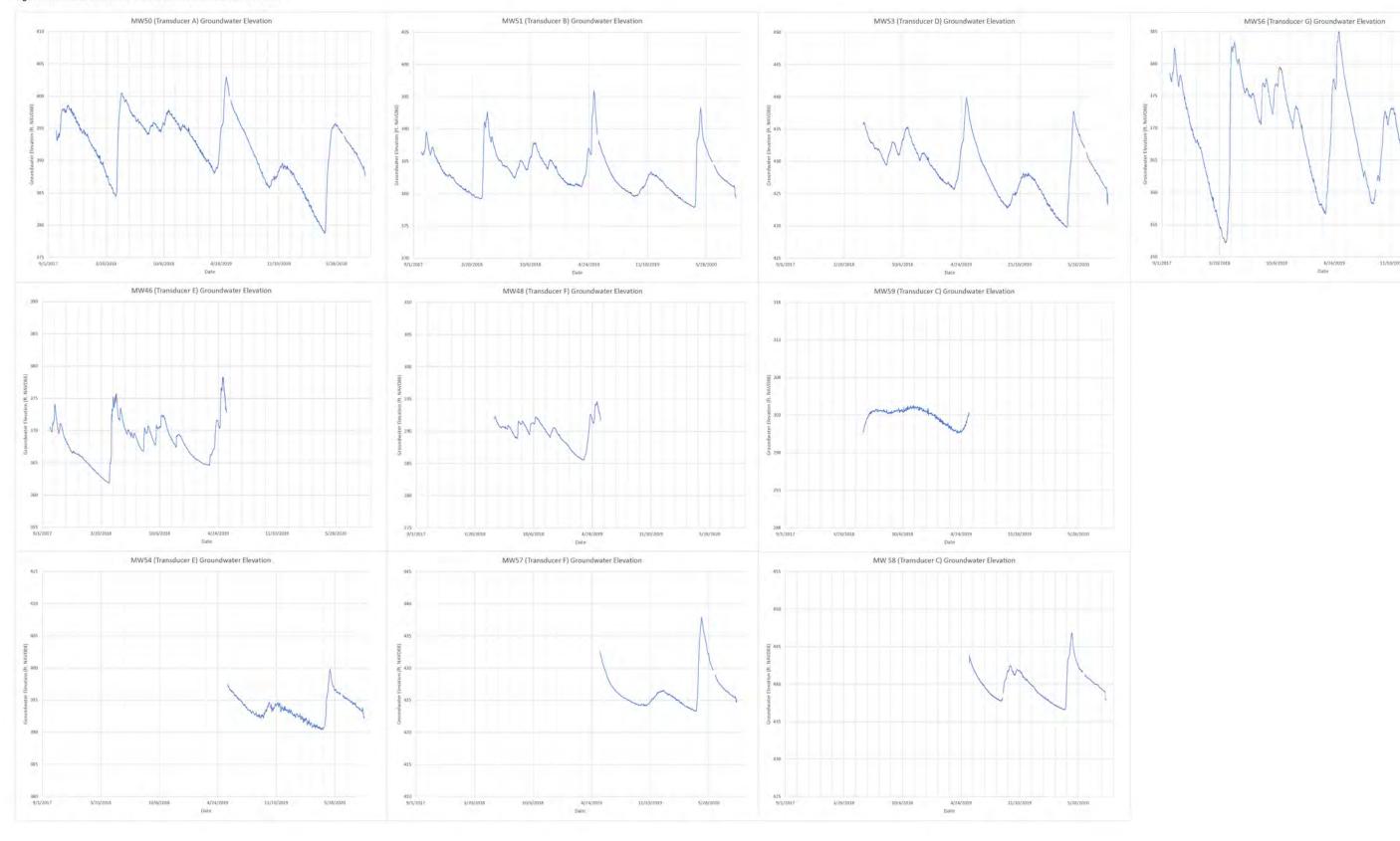
U = The analyte was analyzed for but not detected. The value provided is the method detection limit.

UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Shading = Sample concentration exceeds one or more WQC value.

- (1) USEPA. 2016. National Recommended Water Quality Criteria Aquatic Life Criteria. Accessed May 9, 2017 at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#table
- (2) USEPA. 2016. National Recommended Water Quality Criteria Aquatic Life Criteria. Accessed May 9, 2017 at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#table
- (3) ADEC. 2008. Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (as amended through December 12, 2008). ADEC, Anchorage, Alaska
- (4) ADEC. 2008. Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (as amended through December 12, 2008). ADEC, Anchorage, Alaska (5) Calculated total hardness as CaCO3 = Calcium Hardness (mg/L as CaCO3) + Magnesium Hardness (mg/L as CaCO3)
- (6) Hardness-adjusted criterion value was calculated following EPA 2016 and ADEC 2008. A total hardness value of 109.8 mg/L as CaCO3, based on the average value for Red Devil Creek surface water samples, is assumed.
- (7) As of 2017, the USEPA no longer considers copper to be hardness-dependent.
- (8) Table 3-6 in the 2019 Baseline Monitoring Report has been revised to include corrected laboratory data. Refer to the Red Devil Mine 2019 Baseline Monitoring Report Fall 2019 Analytical Data Correction Memo in the Administrative Record for corrected fall 2019 data.

Figure 3-3 Continuous Groundwater Levels in Selected Wells - Fall 2017 to Fall 2020



4

Conclusions and Recommendations

4.1 Groundwater

Groundwater monitoring results from 2020 baseline monitoring events are generally consistent with the results of previous investigations at the RDM, as described in the *Final Red Devil Mine Groundwater and Surface Water Report* (E & E 2019b).

Groundwater elevation results from the spring and fall 2020 baseline monitoring events support the existing understanding of groundwater flow in the MPA, surface mined area (SMA) and upland areas of the site. Groundwater in the vicinity of the MPA generally mimics topography and flows toward Red Devil Creek. However, within the SMA, mine workings affect groundwater depth and gradient near the mine workings. The mine workings provide a highly transmissive hydraulic connection that depresses the water table in those areas and establishes a hydraulic gradient toward the collapsed mine workings. The groundwater elevation results indicate a preferential flow pathway in the vicinity of the mine workings through the center of the SMA toward Red Devil Creek.

Continuous groundwater elevation data from the 2020 baseline monitoring events (presented in Figure 3-3) build on previous understanding of temporal trends in groundwater elevations at the RDM. In late spring, groundwater elevations quickly rise to a peak level corresponding with maximum snowmelt, followed by a period of generally decreasing water levels during the summer punctuated by occasional rises in water levels likely attributable to rain events. Water levels decrease during the winter with freezing conditions. Water levels at monitoring wells used to measure continuous groundwater elevations in the SMA varied seasonally by between approximately 10 to 35 feet.

Concentrations of primary contaminants of concern (COCs)—antimony, arsenic, and mercury—in groundwater samples from the 2020 baseline monitoring events follow expected trends in spatial distribution, based on previous sampling. In general, the highest concentrations of COCs are found where tailings/waste rock lie below the water table, including the MPA and parts of the Red Devil Creek valley downstream alluvial area, with generally lower concentrations found in areas of the SMA that are not influenced by natural mineralization. Concentrations of COCs in groundwater at the RDM do not exhibit obvious temporal trends.

4 Conclusions and Recommendations

Graphs of groundwater COC concentrations and static water levels for selected wells from spring 2010 through fall 2020 are presented in Figure 4-1.

4.2 Surface Water

Surface water monitoring results from 2020 baseline monitoring events are generally consistent with the results of previous investigations at the RDM, as described in the *Final Red Devil Mine Groundwater and Surface Water Report* (E & E 2019b). Estimated surface water discharge in spring 2020 ranged from 0.17 at the seep to 1.28 cubic feet per second (cfs) at station RD08 near the Red Devil Creek delta. The creek generally appeared be gaining over most of its length below RD10. This observation is consistent with previous characterization of baseflow conditions in Red Devil Creek, described in section 3.2.2 of the 2014 RI (E & E, 2014). Discharge in fall 2020 was relatively low, with Red Devil Creek discharge ranging from 0.39 to 0.44 cfs. The creek generally appeared to be gaining over most of its length below RD10.

Trends in surface water concentrations of COCs at the RDM are influenced by interaction between groundwater and surface water in Red Devil Creek. Groundwater emerges to surface water as Red Devil Creek baseflow and via the seep located adjacent to the creek in the MPA. Red Devil Creek is impacted primarily by emergence of groundwater into the stream along gaining reaches in the MPA. Concentrations of COCs increase longitudinally moving from upstream to downstream of the MPA along Red Devil Creek. A longitudinal plot of surface water concentrations in Red Devil Creek is presented as Figure 4-2.

4.3 Recommendations

Groundwater sampling and analysis has evolved over the course of this CERCLA project from characterization during the Remedial Investigation (RI) to baseline monitoring. Initial goals of groundwater sampling and analysis were consistent with the overall objectives of the RI and were focused primarily on the area along the lower reach of Red Devil Creek referred to as the MPA. Additional monitoring wells have been installed since the initial RI was completed that have broadened our understanding of flow within the bedrock aquifer in areas that are influenced by natural mineralization but are not affected by the tailings and waste rock. The BLM selected a preferred remedial action alternative in 2020 that involves consolidating tailings/waste rock in an engineered repository located in the SMA. Consequently, groundwater characterization emphasizing the area dominated by tailings (i.e., MPA) and a broad range of potential contaminants has transitioned to baseline monitoring focused on flow characteristics within the SMA and the MPA. Understanding groundwater flow upgradient of the existing tailings piles is critical to establishing a baseline condition in the MPA following remedial action.. Therefore future baseline monitoring focus on the SMA, with a limited number of wells in the MPA.

Figure 4-1a. Groundwater Concentrations and Elevation - Upstream Alluvial Area

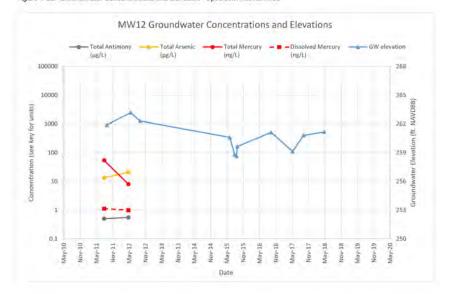


Figure 4-1b. Groundwater Concentrations and Elevation - Upland Area

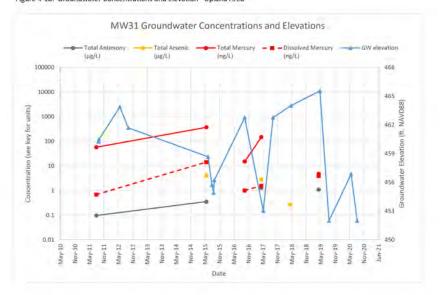
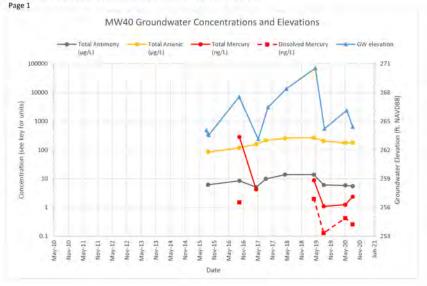
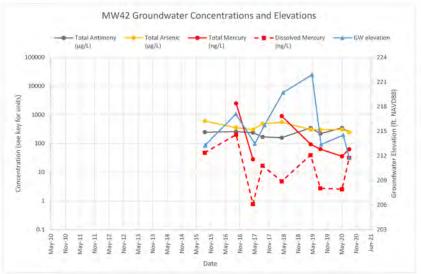
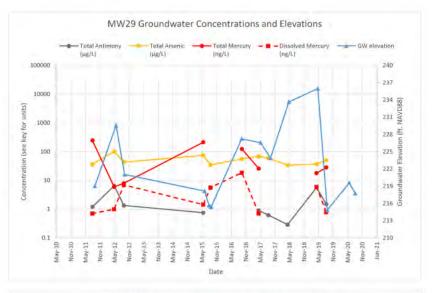


Figure 4-1c. Groundwater Concentrations and Elevation - Surface Mined Area







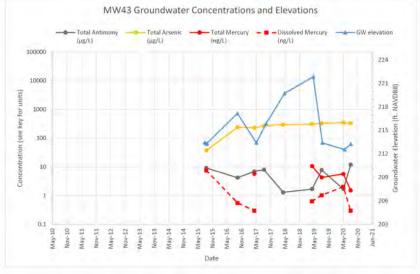
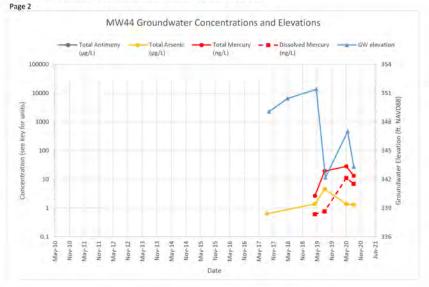
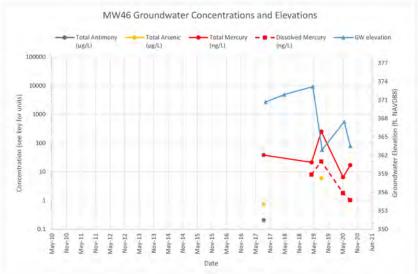
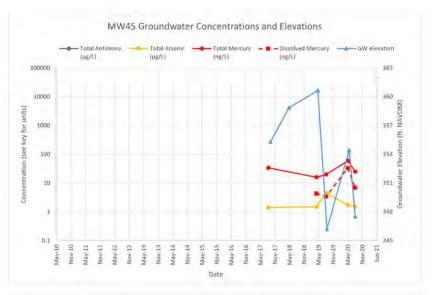


Figure 4-1c. Groundwater Concentrations and Elevation - Surface Mined Area







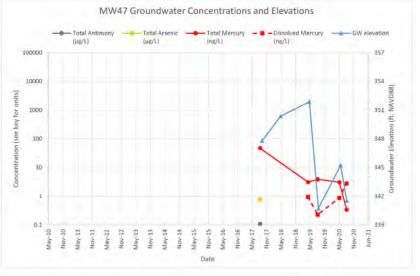
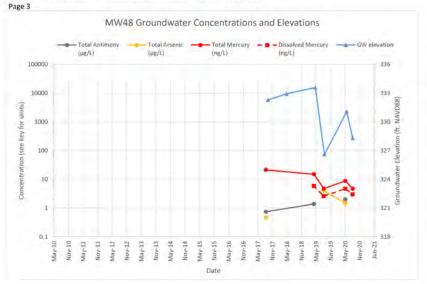
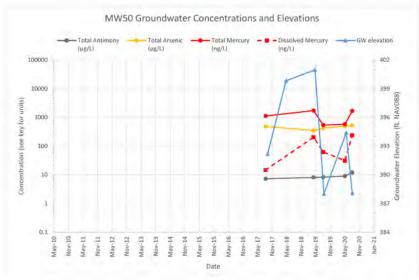
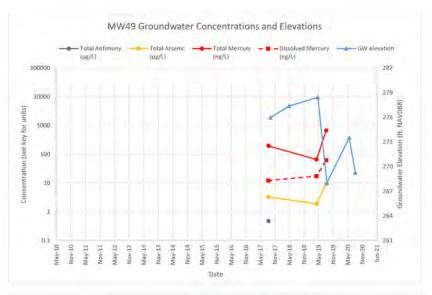


Figure 4-1c. Groundwater Concentrations and Elevation - Surface Mined Area







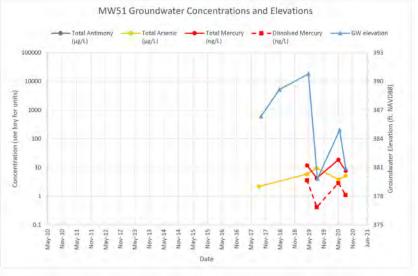
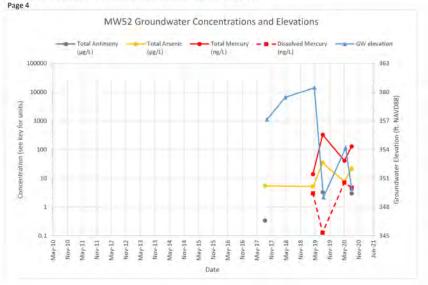
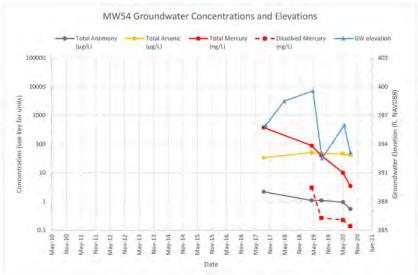
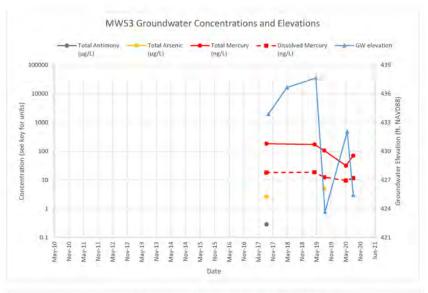


Figure 4-1c. Groundwater Concentrations and Elevation - Surface Mined Area







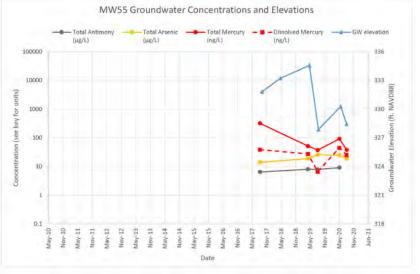
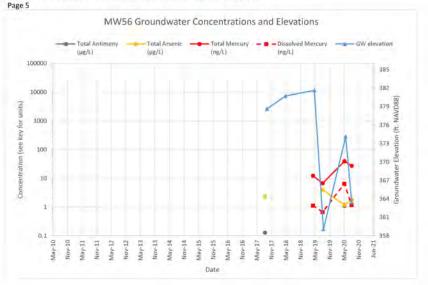
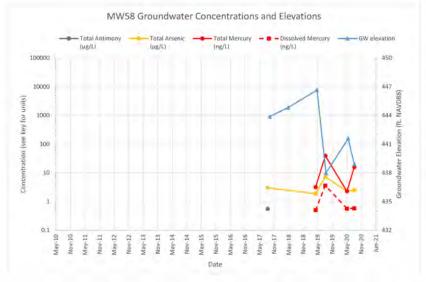
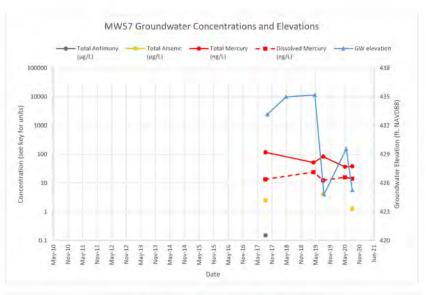


Figure 4-1c. Groundwater Concentrations and Elevation - Surface Mined Area







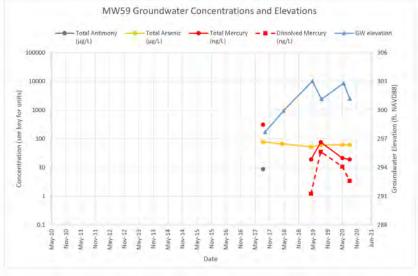
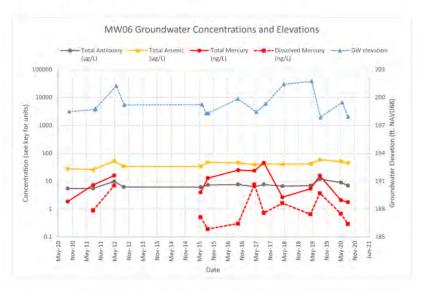
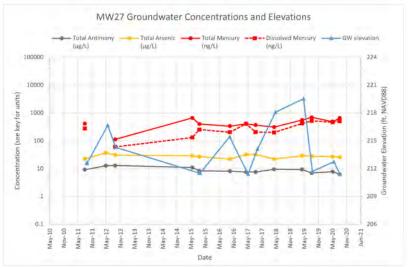
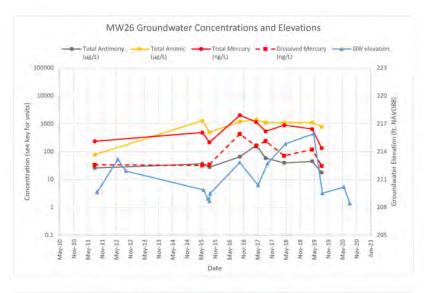


Figure 4-1d. Groundwater Concentrations and Elevation - Pre-1955 Main Processing Area







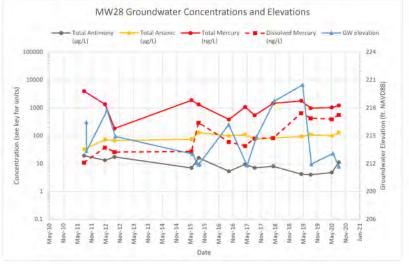
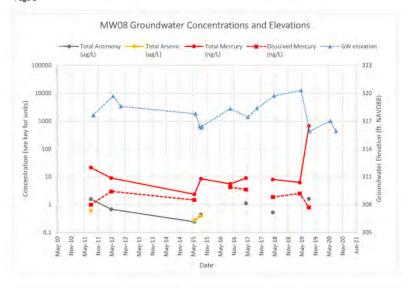
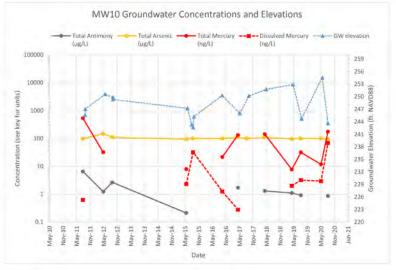
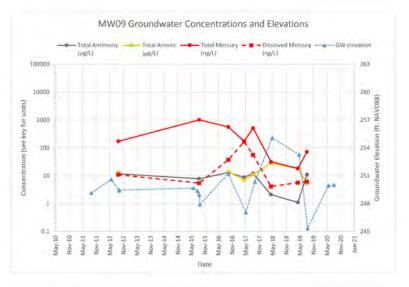


Figure 4-1e. Groundwater Concentrations and Elevation - Post-1955 Main Processing Area Page 1 $\,$







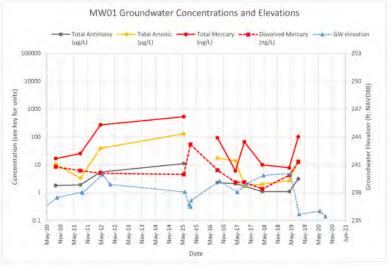
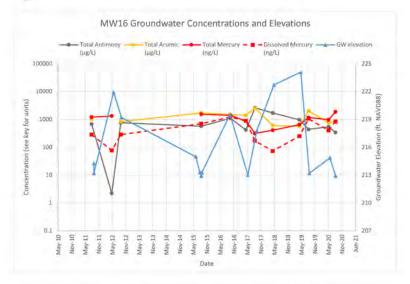
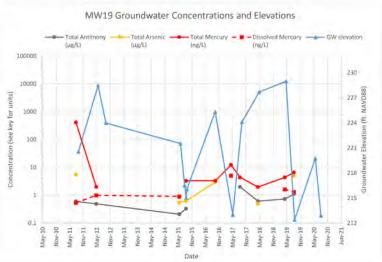
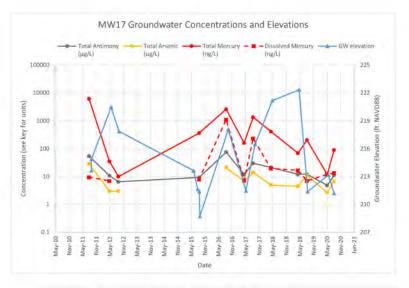


Figure 4-1e. Groundwater Concentrations and Elevation - Post-1955 Main Processing Area Page 2 $\,$







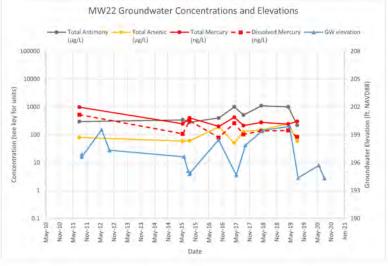
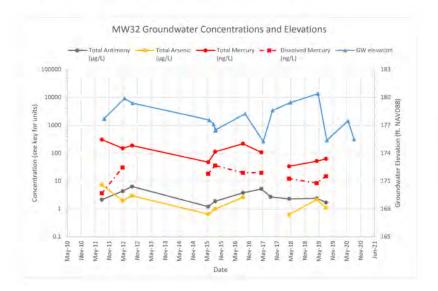


Figure 4-1f. Groundwater Concentrations and Elevation - Downstream Alluvial Area



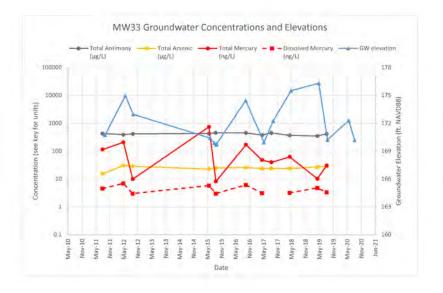
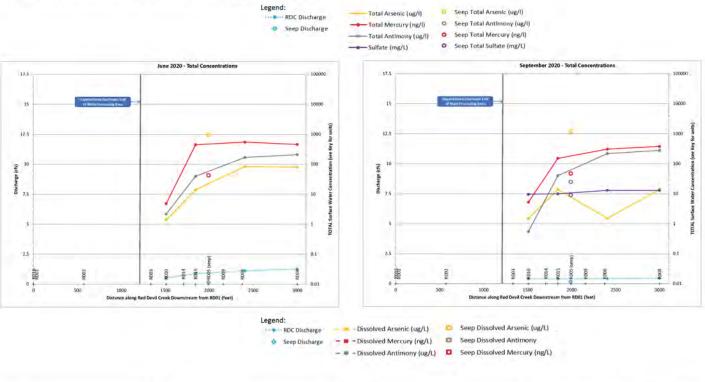
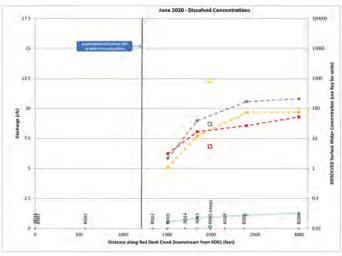
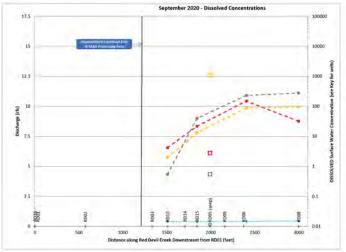


Figure 4-2 Red Devil Creek and Seep Surface Water Concentrations and Discharge, Spring & Fall 2020

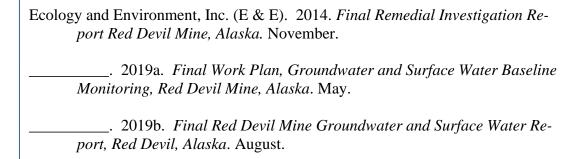








5 References







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Red Devil Mine



Date: 6/16/2020 Direction: NW

Description: Tension cracks along service road to RDM.

Photo Log (Project #1001095.0026.06)



Date: 6/23/2020 Direction: NE

Description: Damaged gabions as part of drainage and NTCRA.



Date: 6/23/2020

Description: View downstream from end of NTCRA spliced section.

Direction: NE



Date: 9/9/2020 Direction: NE

Description: View of repairs made to damaged gabions.

Red Devil Mine



Date: 9/3/2020 Direction: Down

Description: Dedicated well cap installed in MW10.

Photo Log (Project #1001095.0026.06)



Date: 6/23/2020 Direction: SW

Description: Damaged ropes and sandbags located on monofill.

WSP

B Field Logbook

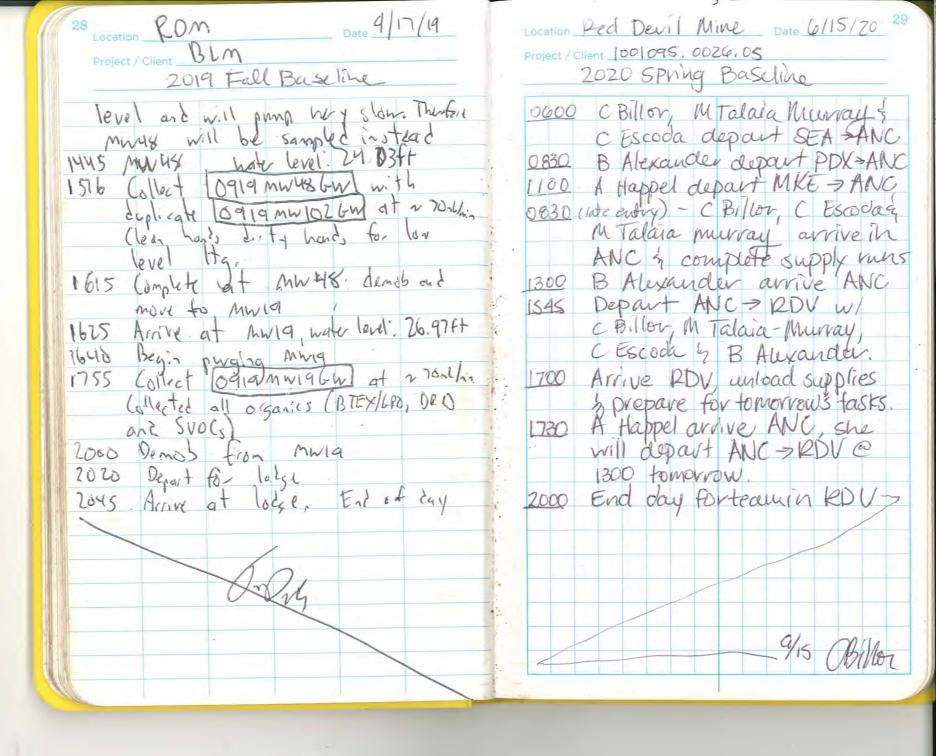


eline 1 19, 820, F20



Monitorina
Fall 2019
Spring 2020
Fall 2020





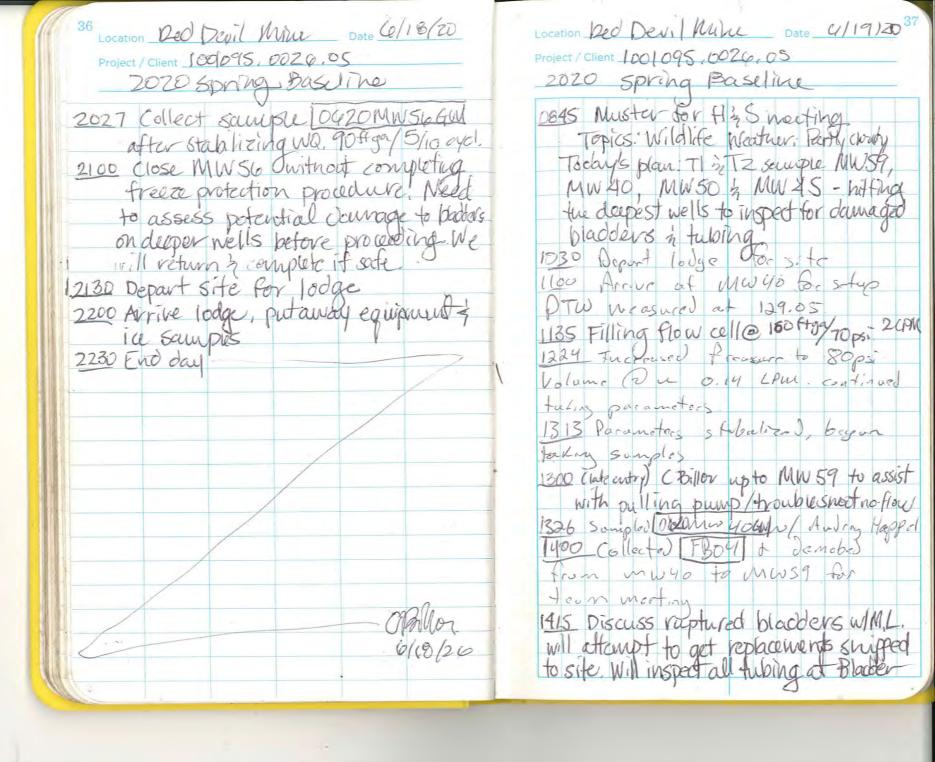
Location Red Devil Mine Date 6/16/22 Project / Client 100 1095 . 0026. 05 2020 Spring Baseline 0835 CB, MTM, BA, CE muster for His mitg, discuss energency coms Sunny 50s-60s F. Today's plan BA, CE prepare bottle Kits AH - finish shopping in ANC & deposit to RDV @ 1300 OB, MTM - Decon pump barlos & bushings Collect vinsate blank Go to site for install of decoved bambs; bushings in replace duraged tubiling 1100 - Begin decon procedure for replacement burbs: 1 Alconox solh: Placed barbs in a 1L sample bottle a agitated w/ alconox 5017. Drain alconox soln, & rinse w/ distilled @ DI rinse: Placed barbs in a container W/ Type 11 DI, rinse 1130 - Collect vinsate blank [RBO]: 3 Transfer cleaned, viused barbs to an clean IL sample bottle that has been triple rinsed w/ BAL DI water,

Location Rad Den Mine Date 6/16/20 31 Project / Client 1001 095,0026,05 2020 Spring Baselik 1130 (cont'd) @ Fill 11 container (w/ barbs) with BAL DI water, From this cont. collect aliquots for TSS, Alk, Nitrates, TAL and then, using CH/DH, Total LL Hg. 113D Collect offeld blank [FBD] at @ lodge 1305 CB & MTM depart lodge for 1330 Protograph NTCRA repairs
345 Avrive at MW56 for bushing/barb replacement & tubing repair 1400 Since MWSB only weeds tubing, and airline is still en route decide to Start at MW57 For bord replace 1500 Afterattempting to remove the bushing, Determine that we need a larger wently Bagged up the pump to complete at Lodge. See late entry ve: transducen ISIS Head to MW43 to inspect tubing and replace if helded. 1530 Pull tubing @ MW43 no signs of freeze dandy but kinkole pump. Repair (cyt) lanked section

Project / Client 100(695, 0026.25

2020 Spring Paseline

1700 Pulled pump, no damage to like so decide to open pump y inspect bladder. Bladder is fully compressed (memory) W/ NO pressure applied when pump is Assassembled. Decide to replace bladder Compressed bladder is likely due to freeze protection procedure Need to atkinpt procedure on other deep wells to see if they are similarly damaged. May need to prioritize blacker replacement based on #of replacement bladders on hand. 828 Measure DTW@37.48 at MN56, remove Levellogger ser al # 00420 73183 1835 Pull pump in MWSG to inspect tubing for possible replacement. pemove I Ift of damaged waterlike. Open pump to inspect bladder and it is intact/fully expanded Water line is free of water to frost date Pedipley pump to original depth.
1850 Begin purging at MWS6



Location Red Devil Milu. Date 6/20/20 39 Project / Client 100 095.0026.05 2020 Spring Baselilu 2900 Site H&S meeting: topics Weather, mass wasting near Lenove's house Today's plan TI: CB, CE sample MWIO, MWIG, MWS8 TZ: MTM, BA, AH Samp MWS4, MWS? 1055 Team I depart for site & will stop to inspect mass wasting/slope tailure on poad to site near Lenove's house 1230 CB, MTM, AH & CE completed inspection of the slope. We think we can safely drive across for today but noted that sees we cracks in the road appear larger after yesterdays vain. Will consult with ML & MMenun regarding abitity to access site sately 1300 Set up on MW10 - will begin purge We inspecting tubing since this well was pulled for barb replaciat 1335 Begin purging MW10 4 CPM 75784x 456 Stabelized DO at MWID 504 Collect sample 12620 MWID GWI 1600 Head to MWSB, note fifter purge was 250ml at MNIO. 1785 Begin purging of MW58, Goffga/is disch

Project / Client 100/095, 0026.05

2020 Spring Baseline

1830 - Stabilized Wa at MW58

1833 - Collect sample GG20MW58GW

Appearance Flow rate visually appeared to decrease during sampling even through pressure remained stable.

1937 - Complete sampling.

2015 - Arrive at MW53. The airline tubing at MW53 is very short, airline is ziptied to exater line. Polled up on air and water line to connect to pump controller. May want to replace airline if time permits. DTW: 34.00 2150 - Stabilized WQ at MW53. Collect

2210 - Complete sampling

sample TOGROMW53GW

2300 - End Day -

6120120

Location Red Devil Mine Date G/21/20

Project / Client 1001095,0026.05

2020 Spring Baseline

6915 - Site H35 meeting topics buddy system, glove protection, Knife safety. Todays Plan. TI: CB, CE Sample MW55, MW46, MW54 Ta: BA, AH sample MW48, MWOG, NWIG MTM to stay at lodge for sample processing 1050 - Team I and 2 depart for site 1110 - Arrive a + MW55. OTW - 44,00 14.00 1135 - Start pumping, Orange precipitate Visible in the first 1148 - Orained flow through cell due to initial turbidity. Resume pumping 1240 - Stabilized WQ at MW 55. Turbidity stabilized near 30NTU. Collect sample [0620MW55GW] Collect field doplicate of MW 55, 0 G 20 MW 102 GW Field Filter purge volume: 400 1330 - complete sampling. 1520 - Arrive at MW46. DTW-35.40 1930 - Start purging at MW46. 60ftgg 1520 - Stabilized WQ at MW46. collect sample 0620MW 46GW Field Filterpurge volume: 1615 - Complete sampling.

Date 6/22/2043 Location Red Devil Mine Project / Client 100 | 095. 0024.05 2020 Spring Baseline 830 Download pressure transducer data: W.L. WELL NAME DATE TIME Bouro 6/17/20 2034 77844 40,12 2111 77954 51 29.77) 2048 17952 54 48,421 2058 77953 50 6/16/20 2124 30,921 77947 58 31.72/ 77927 53 6/17/20 2133 34,121 6/16/20 14/12 67275 57 37,48) 6/18/20 1828 73/83 50 0945 HZS rutg: Slip/trip/fall, derub safety. Today's plan: -2PM Ryan air will plu T2 MTM & AH, taking all samples to date in rental equip. TA samples will ship vide Gold Strk. ANC > SEA, for pickup by TA All staff court work on Samp Droubbing & demob tasks 1245 Collect rihisate off 2 replacement

pladders as 12502. Deconned each

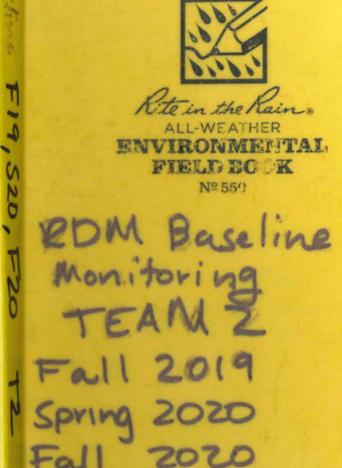
bladder w/ Alconox soling Typell DI

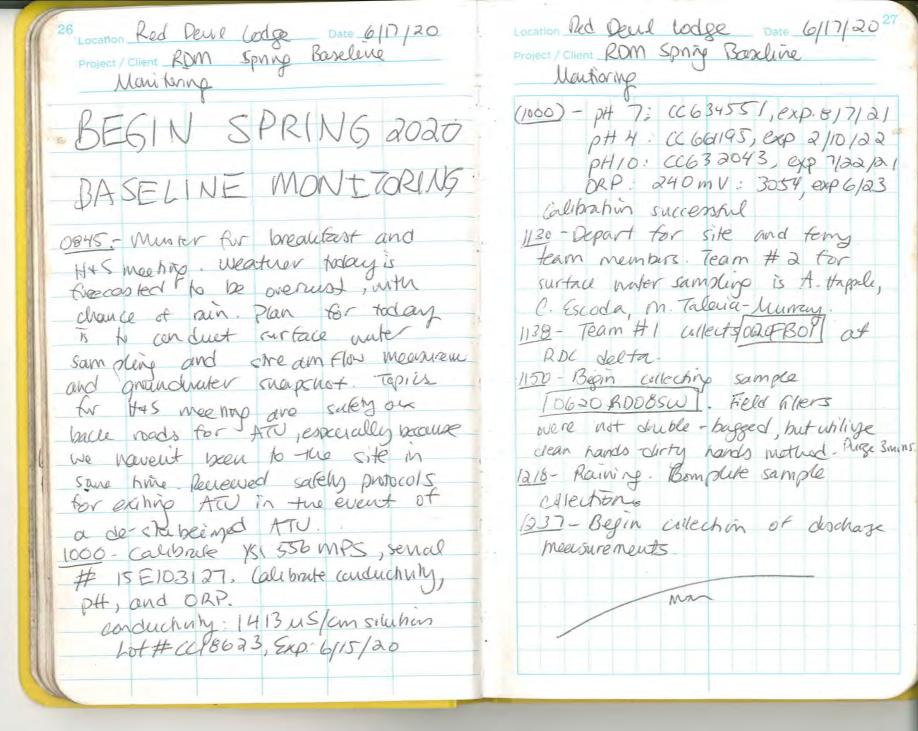
rocation Red Devil Mine Date 6/22/2045 Location Red Devil Mill Date 6/22/20 Project / Client 1001095, 0026.05 Project / Client 1001095.0026.05 2020 Spring Baseline 2020 Spring Baselike 1930 Get consistent nater A on 1245 (contid) And collected rinsate pour of BAL DI into sample constainers at MN59, pumping at 80 psi -190H.ga. and 10/20 ac. 1510 Ryan Air land to P/n MTM, AH 1940 Deploy Barologger at MW39(dry) and Batch I TA samples. 2039 - Stabilized wat Mw 59. Collect 1545 Ryan air flight depart DDV =ANC sample Oco 20 MW 59 GW, Filter purge 2001 1550 Complete transducer data downbad 210 Collect field blank 1807 a vestart for deployment. Note, logger time is syncronized to CB light rain computer, which is pacific time zon 2130 - complete sampling. Depth to top of pump 151.49 ft. 420 Team I depart lodge for site 1330 (late entry) install replicationent 2155 - Head over to MW 43 to assist Stadders on pumps for MW 59 343 BA with purge. work performed on a clean work-2345 - Depart site for lodge, see T2 logbooks for notes on MW43 Space at the lodge failed Burge. Will re-afterupt tom. 1435 Set up on MWS9 to redeploy with replacement tubing to rule pamp, taking extreme camon to reverse of line & avoid out tubing kink/daluage, and Top of pumposet @ 151.49 incr. furottle pressure. 0015 (6/23/20) Finish Icing Samples Inlet= 153.19 , Steady rain and end day. 1825 Begin purging @ MWSP, moving twotte if 16 A inc, every 23 acres above 100ffga. to max (target) throttle OB War 9/22/3 of Most ga

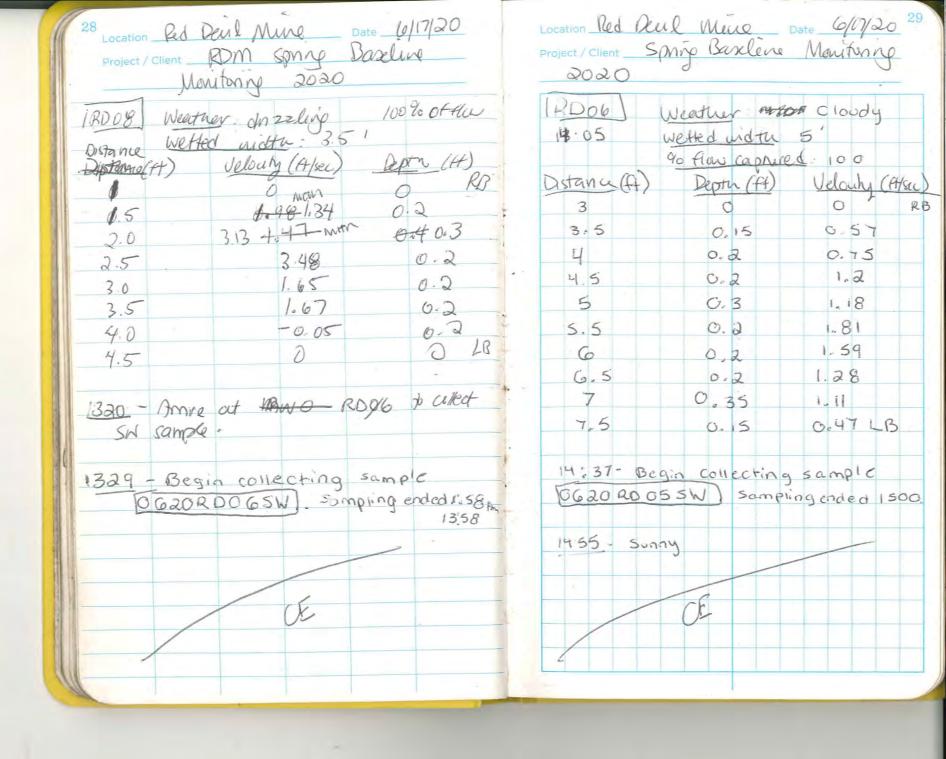
Location Red Devil Mille Date 6/23/2047 Location Ded Devil Mine Date 6/23/20 Project / Client 1001095.0026.05 Project / Client 1001095.0026.05 2020 Spring Baseline 2020 Spring Baseline I 0915 Has meeting: Long hours /fatique 1653 Deploy + ransducer # # 77927 Stop work/veto power CB, BA, CE in MW 53 d+w = 32.40 present Todays plan. 1700 Deploy transducer # 67275 CB, CE reatt. MW43 W/ new tubing in MW 57 d+w= 34.90 Deploy transducer proto NICRA Depart site, locked gates Ryan Air flight @ 8 PM 1730 Arrive lodge to fivalize demob procedures, including 1145 Set up on MW43 sanifizing per COVID protective 1300 Initial depth to water: 89,42 BTOIC Begin Purge of MW43, Collect sample [FB08] plan. Ryan our expected @19:30 1349 Deploy transducer \$73183 in MWSG, atw = 38.29 2000 Depart RDV > ANC with CB, BA and CE, and remaining 1425 #77954 in MW51 dtw = 40.05 samples and gear rental exprision. 2130 Land ANC, begin moving dear in MWS4 dtw = 29.99 to Wavehouse, (late entry) stabilize WQ of MW43 pumping of 120 figny SSpsi, 20/0 Cyc 2200 Load samples & rental egpininto Yukon & go to notel. Will procest & re-ice samples & stave in voom 1411 (lateury) collect sample DG20 MW43 GWI, filter puge 250 ml 2300 End day. light/internuttent vaia bodins 1545 Stop at NTCDA for photos for Warung 1622 Deploy fransduar #77953 in MONSO dtw = 48.85 1637 Deploy transducer # 77947 in MW 58 dtw= 31.42

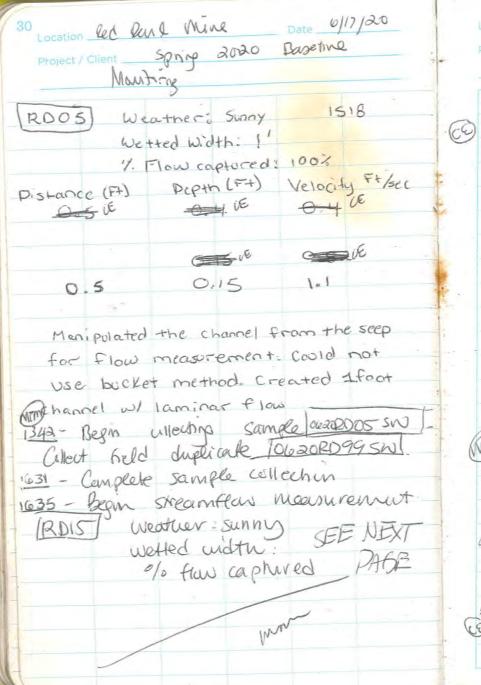


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Project/Client Spring 2020 Barchine
Mailway.

~		
Distance (ft)	Depth (At)	velocity (H/sa)
9		
2	0.15	O RE
2.5	0.15	-0.03
3	0.2	-0.02
3.5	0,3	0.16
4	0.5	0,53
4.5	0.5	0.80
5	0.5	1.00
5.5	0.5	0.77
G	0,35	0.4
6.5	0.2	0.22 CB
weather	: 5บกกฯ	
wedted	width: 4.51	£+
(Man) 1. Flow	captured: 100	01.
1730 - Amve	at RDIOSH	I to collect
1730 - Amve sample pages	105 W and	maun'x
spike of in	retals analy;	ies. Former lac.
of RD10 no d	longer has	flow, the
channel ha	shitted to	the south.
closer to mu	NO/0	
173		
(800 - Com	plete samp	he collection

32 Location Red D	DILO AL	in	Date 61	17/20	
Project / Client	Sonly 2	020	Bascli	re	
Mariton					
	1	(NTM)	ο A		1
	cather:		119		1:1
	tted wid.		. 6/9		
	low Ca	ptured	3/0100	by (Ft/F)	
Distance (F+)		_	Veloc	LB	
2	0.	15	0.18	- :	1
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3	0.0		0.44		1
3,5	0.0		0.55		
	0.3		0.71		
4.5	0,3		.00		1
5,5	0.2		0.29		7=
	0.15		39		
(0.5	0:15		.61		-
7	0.15		לו.		
7.5	G. 2		23		
8-	0.2	0.	38	RB	4
(nith) Comple	le strea	mflow	meesure	meut.	3.
Ferry A. H	tappe 1	back &	ladge.	Reld	
team to a.	rsist t	ne cur	plehon	of	7
goundwater	snapsho	t. No	to fun	6W	-
snapshot as	re liept	in spar	we hold	Term	1
2034 - Pemu	e bamo.	logger	for M	W39.	16
Centinue	GN 51	rapshot			-

Project/Client Spring 2020 Partine

Manutary

2200 - Complete GW snapshot and depart site the holge.
2245 - and day. Back up Gowalier form. Sample & shored on ice in cerolers.

Project / Client Spring 2020 Passline Manky 0930 - Muster for breakfarst and discuss plan for boday. O Begin GW sampling of mw27, Ma8, mw42, mw43. Weather boday is 20% chance of min, high of 610F. 0945 - Hold Has meeting. Topics discussed include danging more burnges to the site to ensure that we are adequately

hyanded. Also discussed cleany roads of bush to ensure sate dring

1000. Calibrate USI 536 MPS meters: Serial #5: 15 E/63127 and 114101295. Used same solution as gesterolay. Calibration Snugraful.

1130 - Depart lodge for site . Amure at site and disp. C. Esco da. Rehim to lodge to feetch An Itappel. 1200 - Return to sit and MW 27 to begin

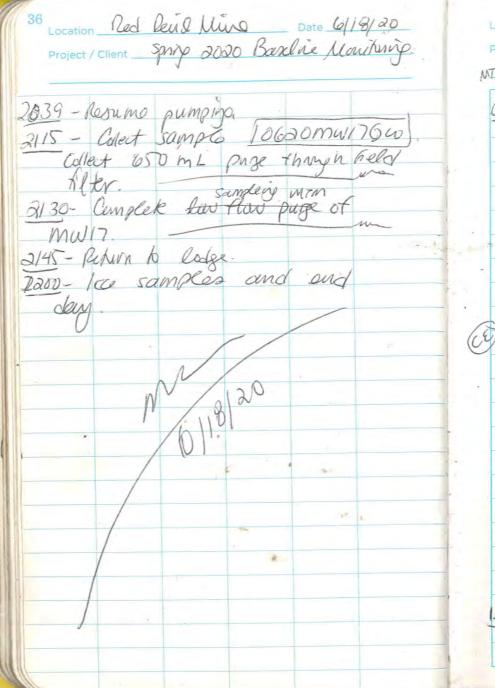
low flow puze, 1225 - DTW: 30 22 bloc. Topot pump at 32.63' btoil

1250-begin low flow pure of MW27. 135D. - Collect sample 10620M0127600.

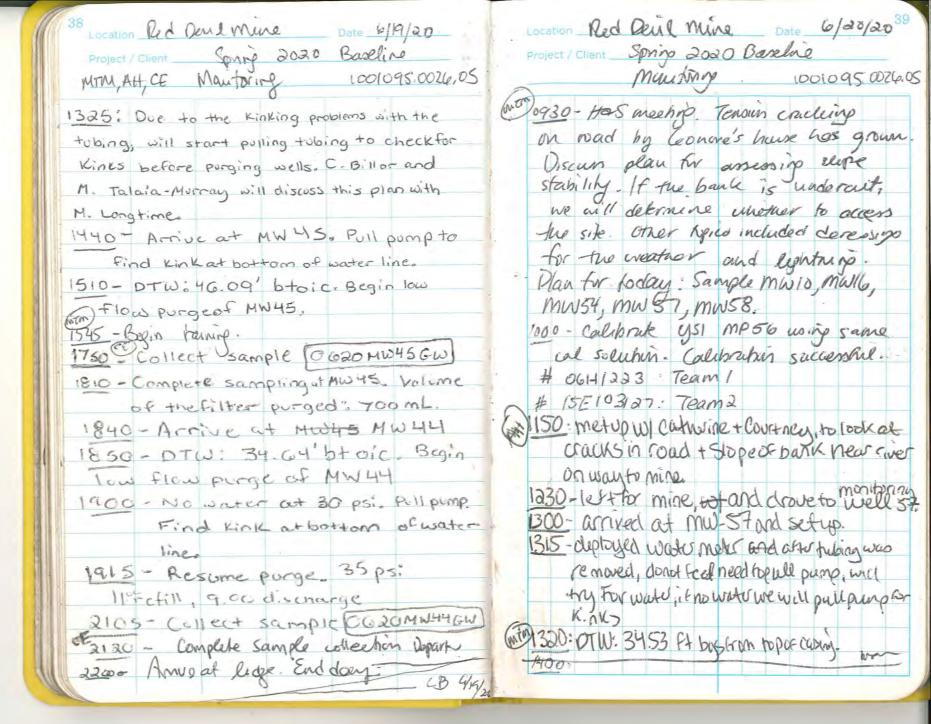
I mun page on Keld hiter a approx 650ml

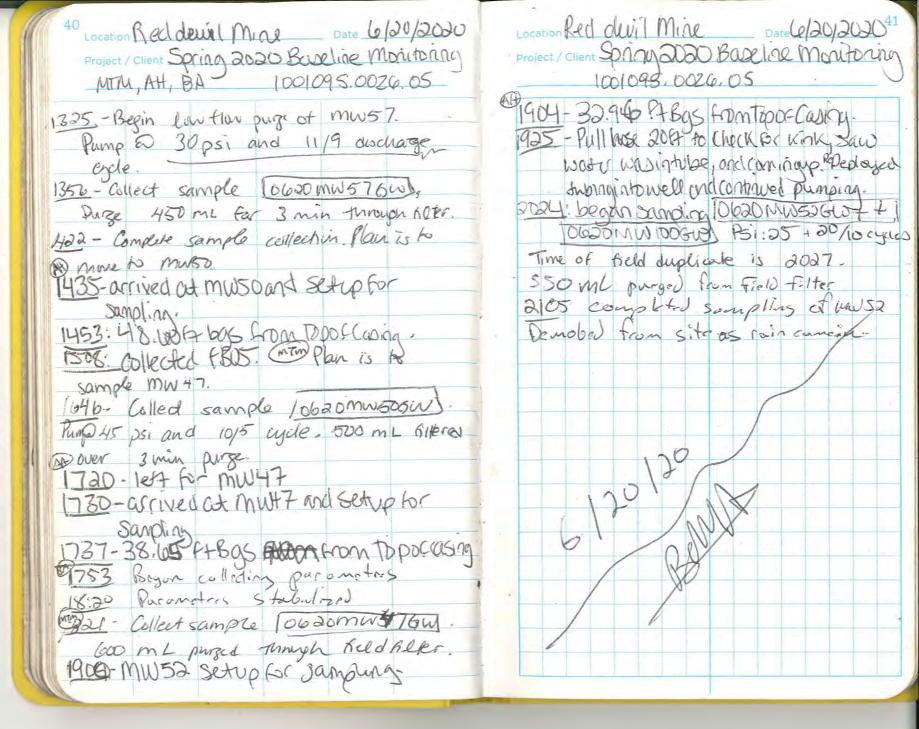
Location led Devel Mure Date 6/18/20 35 Project/Client Spring 2020 paseline Moniformi

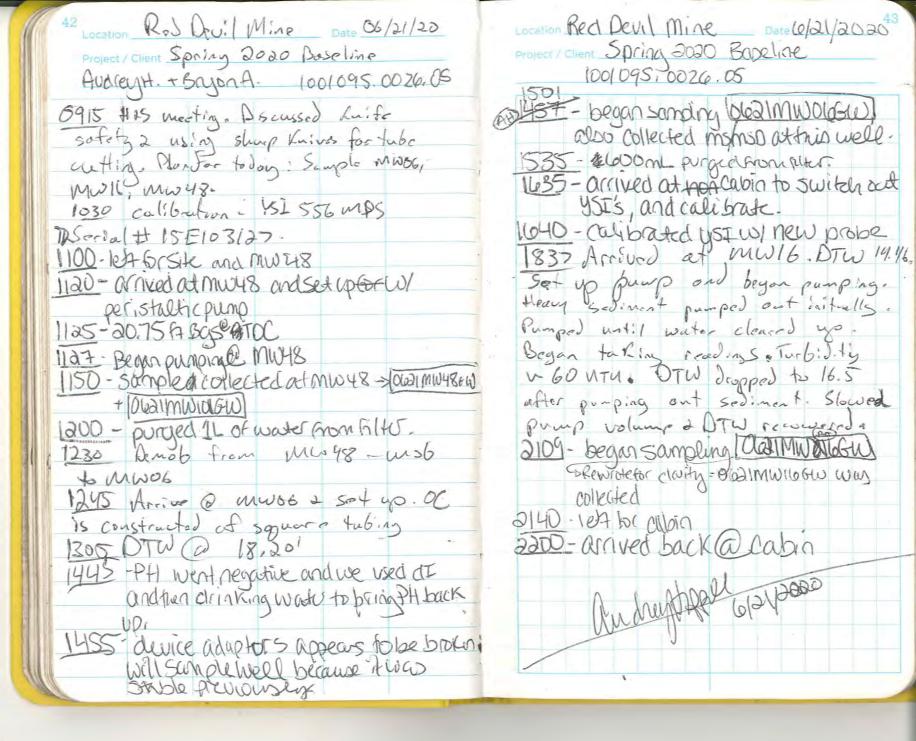
1433 - Collect porpBO3 from MPA in wanty of mw27. 1500 - Arrive at MW42 DTW was 127.83' baic op of pump 133' broic. 515-Begin low flow proje of muy2 1615 - No water at 70 psi . Pull pump Kihle in water line. 1650 - Redeploy pump and resume purge aump sething a 160/10 psi and 20/10- -1850 - Cillet sample -062042 with 10020 mw 426w1 1915 - Complete sample callection Tid not do treeze protection at this pine Chelled of C Billor and determined that we may wait and page the unter line at a later date 1950- Ambeat MW17. DTW 15.55' book. pump men tubing inlet set at pre-defined depth (land in hibing.) 1953 - Begin pumping 2034 - Sho pumping whiter not drawip.

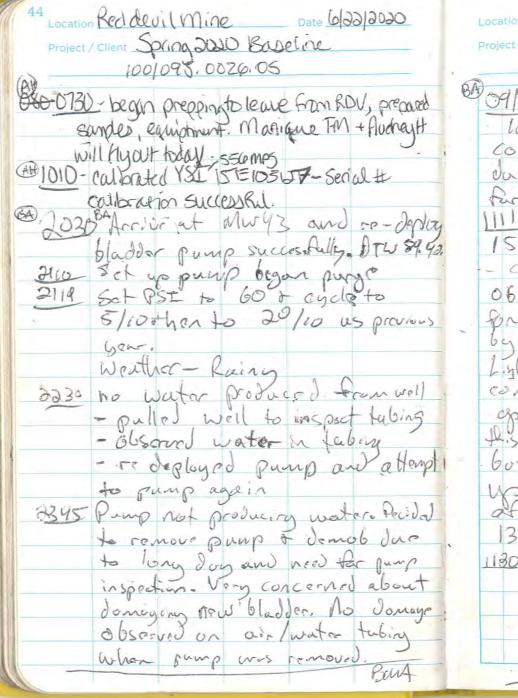


Location Red Deul Wine Date 6/19/20 37 Project/Client Spring 2020 Baseline MTM, AH, CE Mantering 1001095,0026.85 0830 - Muster for breakfort and dixussion of day's dan Team I to replace blacker in pump from Mirth3 Team 2 to continue OW sampling from depent to shallower wells. MW59, MW48, MW50, MW45 0945 - Calibrate USI STGMPS meters: senal #5: 15E 103127 (Team Z) and 11/10/095 (Team (). Same solutions calibration successful. (0) 1030 Depart lodge for site. Arriveat Site and drop C. Escoda, Reta M. Taloña-Munuy Returns to lodge to fetch A. Happel 1125 - Return to site and MW 59 to begin low flow purge. 1150 - DTW: 132.52 btoic. Begin pumping. low how purge 1230 - No water at 80 psi. Pull pump. Water line is kinked and water found in airline. No visible holes in bladder Attempting to troubleshoot problem. 300 - After troubleshooting determined there is a hole in the bladder.









Project/Client Spring 2020 Pase 1/23/2070 45

09/5 - Town whootvay had an logistics followed by HAS. covered working shorter hours during wisp up. Demol planned For 9124 pending air travel logistics. 15 = 103127 - Calibration excepta - Canductivity 2300 -0 1431 0641223 - cultration acceptal except for cond- Clound in OF by filling Starge Container & Lightly Study Completed confidence diech & Cond appeared in Longe @7450 -Ais - 120 of roge listed on bother use Dovice as book us only . Hompted 300 cal of cons. and was snarssful 370 = 1431. 1130 CB' CE depart to sample MW43 BA complete demob packing & district per covid safety plan. See J logbook -





C Data Usability Summary Report



Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: March 9, 2021	Completed by: Eridania Marte

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness based on applicable sections of the following guidelines.

- Final Quality Assurance Project Plan, Baseline Monitoring, Red Devil mine, Alaska. May 2019.
- National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001, January 2017.

Specific criteria for QC limits were obtained from the site specific QAPP. Compliance with the project QA program is indicated in the checklist and tables below. Any major or minor concerns affecting data usability are listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Laboratory	Sample Delivery Group	Project Code
Test America, Seattle	580-95586-1	1001095.0026.06

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	QC	ID Correct -ions
580-95586-1	WH	0620RS01	580-95586-1	6/16/2020 11:30			
580-95586-1	SW	0620RD05SW	580-95586-2	6/17/2020 14:44			
580-95586-1	SW	0620RD06SW	580-95586-3	6/17/2020 13:29			
580-95586-1	SW	0620RD08SW	580-95586-4	6/17/2020 11:50			
580-95586-1	SW	0620RD10SW	580-95586-5	6/17/2020 17:34		MS/MSD	
580-95586-1	SW	0620RD15SW	580-95586-6	6/17/2020 15:42			
580-95586-1	SW	0620RD99SW	580-95586-7	6/17/2020 15:55			
580-95586-1	WG	0620MW17GW	580-95586-8	6/18/2020 21:15			
580-95586-1	WG	0620MW27GW	580-95586-9	6/18/2020 13:50			
580-95586-1	WG	0620MW28GW	580-95586-10	6/18/2020 14:07			
580-95586-1	WG	0620MW42GW	580-95586-11	6/18/2020 18:50			
580-95586-1	WG	0620MW56GW	580-95586-12	6/18/2020 20:27			
580-95586-1	WG	0620MW40GW	580-95586-13	6/19/2020 13:26			
580-95586-1	WG	0620MW44GW	580-95586-14	6/19/2020 21:05			
580-95586-1	WG	0620MW45GW	580-95586-15	6/19/2020 17:50			
580-95586-1	WG	0620MW51GW	580-95586-16	6/19/2020 19:07			
580-95586-1	WG	0620MW100GW	580-95586-17	6/20/2020 20:27			
580-95586-1	WG	0620MW10GW	580-95586-18	6/20/2020 15:04			
580-95586-1	WG	0620MW47GW	580-95586-19	6/20/2020 18:21			
580-95586-1	WG	0620MW50GW	580-95586-20	6/20/2020 16:46			
580-95586-1	WG	0620MW52GW	580-95586-21	6/20/2020 20:24			
580-95586-1	WG	0620MW53GW	580-95586-22	6/20/2020 21:50			
580-95586-1	WG	0620MW57GW	580-95586-23	6/20/2020 13:56		_	
580-95586-1	WG	0620MW58GW	580-95586-24	6/20/2020 18:33			
580-95586-1	WG	0620MW06GW	580-95586-25	6/21/2020 15:01		MS/MSD	
580-95586-1	WG	0620MW101GW	580-95586-26	6/21/2020 11:50			
580-95586-1	WG	0620MW102GW	580-95586-27	6/21/2020 12:40			

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: March 9, 2021	Completed by: Eridania Marte

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	QC	ID Correct -ions
580-95586-1	WG	0620MW16GW	580-95586-28	6/21/2020 21:09			
580-95586-1	WG	0620MW46GW	580-95586-29	6/21/2020 15:20		MS/MSD	
580-95586-1	WG	0620MW48GW	580-95586-30	6/21/2020 11:50			
580-95586-1	WG	0620MW54GW	580-95586-31	6/21/2020 19:31			
580-95586-1	WG	0620MW55GW	580-95586-32	6/21/2020 12:40			

SDG	Matrix	Test Method	Number of Samples	Sample Type
580-95586-1	W	6010D – Metals ICP (Al, Ca, Fe, Mg, K, Na)	28	N
580-95586-1	W	6010D – Metals ICP (Al, Ca, Fe, Mg, K, Na)	4	FD
580-95586-1	W	6010D – Metals ICP (Al, Ca, Fe, Mg, K, Na)	2	LR
580-95586-1	W	6010D – Metals ICP (Al, Ca, Fe, Mg, K, Na)	3	MS/MSD
580-95586-1	W	6010D – Metals ICP Dissolved (Al, Ca, Fe, Mg, K, Na)	5	N
580-95586-1	W	6010D – Metals ICP Dissolved (Al, Ca, Fe, Mg, K, Na)	1	FD
580-95586-1	W	6010D – Metals ICP Dissolved (Al, Ca, Fe, Mg, K, Na)	1	LR
580-95586-1	W	6010D – Metals ICP Dissolved (Al, Ca, Fe, Mg, K, Na)	1	MS/MSD
580-95586-1	W	6020B – Metals ICP/MS	28	N
580-95586-1	W	6020B – Metals ICP/MS	4	FD
580-95586-1	W	6020B – Metals ICP/MS	2	LR
580-95586-1	W	6020B – Metals ICP/MS	3	MS/MSD
580-95586-1	W	6020B – Metals ICP/MS Dissolved	5	N
580-95586-1	W	6020B – Metals ICP/MS Dissolved	1	FD
580-95586-1	W	6020B – Metals ICP/MS Dissolved	1	LR
580-95586-1	W	6020B – Metals ICP/MS Dissolved	1	MS/MSD
580-95586-1	W	7470A – Mercury	28	N
580-95586-1	W	7470A – Mercury	4	FD
580-95586-1	W	7470A – Mercury	2	LR
580-95586-1	W	7470A – Mercury	3	MS/MSD
580-95586-1	W	7470A – Mercury, Dissolved	5	N
580-95586-1	W	7470A – Mercury, Dissolved	1	FD
580-95586-1	W	7470A – Mercury, Dissolved	1	LR
580-95586-1	W	7470A – Mercury, Dissolved	1	MS/MSD
580-95586-1	W	353.2 - Nitrogen, Nitrate-Nitrite	28	N
580-95586-1	W	353.2 - Nitrogen, Nitrate-Nitrite	4	FD
580-95586-1	W	353.2 - Nitrogen, Nitrate-Nitrite	2	LR
580-95586-1	W	353.2 - Nitrogen, Nitrate-Nitrite	6	MS/MSD
580-95586-1	W	SM2320B – Alkalinity	28	N
580-95586-1	W	SM2320B – Alkalinity	4	FD
580-95586-1	W	SM2320B – Alkalinity	3	LR
580-95586-1	W	SM2540D – Total Suspended Solids (TSS)	28	N

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring		
Date Completed: March 9, 2021	Completed by: Eridania Marte		

SDG	Matrix	Test Method	Number of Samples	Sample Type
580-95586-1	W	SM2540D – Total Suspended Solids (TSS)	4	FD
580-95586-1	W	SM2540D – Total Suspended Solids (TSS)	2	LR
580-95586-1	W	SM2540C – Total Dissolved Solids (TDS)	5	N
580-95586-1	W	SM2540C – Total Dissolved Solids (TDS)	1	FD
580-95586-1	W	9060 Organic Carbon, Total (TOC)	5	N
580-95586-1	W	9060 Organic Carbon, Total (TOC)	1	FD
580-95586-1	W	9060 Organic Carbon, Total (TOC)	1	LR
580-95586-1	W	9060 Organic Carbon, Total (TOC)	1	MS/MSD

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	No. Anion analysis by EPA Method 300.0 was requested on COC as inorganic ions; however, was not analyzed by laboratory.
Did coolers arrive at lab between 2 and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes.
Frequency of Field QC Samples Correct? Field Duplicate - 1/10 regular samples for each matrix and sampling method and/or type of equipment used. MS/MSD - 1/20 samples for each matrix and each sampling event. Equipment Blank - 1/20 field samples for each collection/decontamination method, by matrix and by sample type.	 Four field duplicates were collected per 28 groundwater samples. Three MS/MSDs were collected for 28 groundwater samples. An equipment blank was collected on discharge barb install on dedicated pumps.
Case narrative present and complete?	Yes.
Any holding time violations?	The following samples were analyzed outside of the technical holding time for TSS and TDS analysis: 0620RS01, 0620RD05SW, 0620RD06SW, 0620RD08SW, 0620RD15SW, 0620RD99SW, and 0620MW17GW. The sample results were J/UJ qualified as estimated.

The following tables are presented at the end of this DUSR and provide summaries of results outside QC criteria:

- Method Blanks Results (Table 2, 2A, and 2B)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4 and 4A)
- LCS Outside Limits (Table 5 and 5A)
- Serial Dilution Outside Limits (Table 6)
- Reanalysis Results (Table 7)
- Field Duplicate Results (Table 8)

Go to List

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: March 9, 2021	Completed by: Eridania Marte

Metals by Method SW-846 6020B	
Description	Notes and Qualifiers
Are any compounds present in method and field	Nickel was detected below the RL in method blank
blanks as noted on Table 2?	580-331582/20-A associated with batch 580-
	331582.
	Nickel was detected below the RL in method blank
	580-331580/11-A associated with batch 580-
	331580. There were no associated samples with
Francisco Viscosite and A. F. Const. Hard Lively	this batch.
For samples, if results are < 5 times the blank	The nickel result in five samples were detected at a value less than 5X the blank detection (580-
then "U" flag data (see Table 2A and 2B).	331582/20-A) and U qualified as non-detect. Six
	samples were greater than 5X the blank detection,
	two out of the six samples were J qualified due to
	being below the RL. All other five associated
	sample results were non-detect for nickel and did
	not require qualification.
Is laboratory QC frequency one blank and LCS	Yes.
with each batch and one set of MS/MSD per 20	
samples?	
Are MS/MSD within QC criteria (see Table 4 and	Yes.
4A)? QC limits are not applicable to sample results greater than 4 times spike amount.	All MS/MSD QC criterions were met. However, PDS for sample 0620RD10SW were recovered
results greater than 4 times spike amount.	above the criteria for multiple analytes. No
	qualifications were made.
	qualifications were made.
	All MS/MSD QC criterions were met. However,
	PDS for sample 0620MW06GW were recovered
	above the criteria for multiple analytes. No
	qualifications were made.
	The DDD values for LD for comple 0000DD100W
	The RPD values for LR for sample 0620RD10SW were outside of the acceptance criteria for arsenic
	and nickel. The sample results were less than 5x
	the RL. No qualification was made.
Is LCS within QC criteria (see Table 5)? If out,	Yes.
and the recovery high with no positive values,	
then no data qualification is required.	
Is initial calibration ≥ 0.998 and RSD between	The r value was not reported by the laboratory.
multiple exposures ≤5%? Minimum 4-point	The data are considered acceptable for use.
linearity.	l V
Is there one serial dilution per 20 samples? Flag	Yes.
all data reported with an "E" as "J".	Yes.
Are serial dilutions within QC criteria (see Table 6)?	165.
Spot check ICS recoveries 80-120%.	The ICSs were within acceptance criteria.
Spot check ICV 90-110%.	The ICVs were within acceptance criteria.
Spot check CCV 90-110%.	The CCVs were within acceptance criteria.
Spot check ICVL/CCVL 70-130%	The ICVL/CCVLs were within acceptance criteria.
Spot check ICB/CCB detections (see Table 2A	Yes.
and 2B).	
Spot check the internal standard recoveries 50-	The internal standards were acceptable.
150%.	

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: March 9, 2021	Completed by: Eridania Marte

Metals by Method SW-846 6020B	
Description	Notes and Qualifiers
Were any samples reanalyzed or diluted (see	All samples were diluted at 5-folds for dissolved
Table 7)? For any sample reanalysis or dilutions,	and total metals.
is only one reportable result flagged?	
Do field duplicate results show good precision for	Yes.
all compounds (see Table 8)?	

Metals by Method SW-846 6010D	
Description	Notes and Qualifiers
Are any compounds present in method and field blanks as noted on Table 2?	No.
For samples, if results are < 5 times the blank then "U" flag data (see Table 2A and 2B).	No qualification required.
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Are MS/MSD within QC criteria (see Table 4 and 4A)? QC limits are not applicable to sample results greater than 4 times spike amount.	The laboratory performed a duplicate analysis on sample 0620RD10SW, and the sodium results exhibited an elevated RPD. The sample results were less than 5X the PQL; therefore, no qualification of the data was required.
Is LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes.
Is initial calibration ≥ 0.995? Minimum 5-point linearity.	Yes.
Is there one serial dilution per 20 samples? Flag all data reported with an "E" as "J".	Yes.
Are serial dilutions within QC criteria (see Table 6)?	No. Calcium and magnesium exhibited recovery above the acceptance criteria for samples 0620RD10SW (dissolved) and 0620MW06GW. The sample results were J qualified as estimated.
Spot check ICS recoveries 80-120%.	The ICSs were within acceptance criteria.
Spot check ICV 90-110% and < 20% RSD.	The ICVs were within acceptance criteria.
Spot check CCV 90-110%.	The CCVs were within acceptance criteria.
Spot check ICVL/CCVL 50-150%.	The ICVL/CCVLs were within acceptance criteria.
Spot check ICB/CCB detections (see Table 2A and 2B).	Yes.
Spot check the internal standards – must be 30-120% of the intensity of the calibration blank.	The internal standards were acceptable.
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	Yes.

Mercury by Method SW-846 7470A	
Description	Notes and Qualifiers
Any compounds present in method or field blanks (see Table 2)?	No.
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	No qualification required.

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: March 9, 2021	Completed by: Eridania Marte

Mercury by Method SW-846 7470A	
Description	Notes and Qualifiers
Is Laboratory QC frequency at least one blank,	Yes.
LCS and MS/MSD with each batch?	
Is MS/MSD within QC criteria (see Table 4 and	Yes.
4A)? If out and LCS is compliant, then "J" flag	
positive data in original sample due to matrix.	
Is LCS within QC criteria (see Table 5)? If out,	Yes.
and the recovery is high with no positive values,	
then no data qualification is required.	
Is initial calibration ≥ 0.995?	Yes.
Spot check ICV 90-110%.	The ICVs were acceptable.
Spot check CCV 80-120%.	The CCVs were acceptable.
Spot check ICB/CCB detections (see Table 2A	The CCBs were acceptable.
and 2B).	
Were any samples reanalyzed or diluted (see	No.
Table 7)? For any sample reanalysis or dilutions,	
is only one reportable result flagged?	
Do field duplicate results show good precision for	Yes.
all compounds (see Table 8)?	

Alkalinity by Standard Method 2320B	
Description	Notes and Qualifiers
Are any compounds present in method and/or	Method blanks are not applicable to this
field blanks as noted on Table 2?	technique.
For samples, if results are < 5 times the blank,	N/A
then "U" flag data (see Table 2A and 2B).	
Is laboratory QC frequency at least one LCS and	Yes.
duplicate with each batch of up to 20 samples?	
Is LCS/LCSD within QC criteria (see Table 5 and	Yes.
5A)? If out, and the recovery high with no positive	
values, then no data qualification is required.	
Is initial calibration verification within QC limits?	Yes.
Is continuing calibration within QC limits?	Yes.
Are laboratory duplicates within QC limits?	Yes.
Do field duplicate results show good precision for	No.
all compounds (see Table 8)?	Alkalinity/Bicarbonate Alkalinity as CaCO3
	exhibited poor precision between the parent
	sample and duplicate sample for samples
	0620MW52GW and 0620MW100GW. The sample
	results were J qualified as estimated values.

Anions by EPA Method 300.0	
Description	Notes and Qualifiers
Are any compounds present in method, continuing calibration, and/or field blanks?	No.
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	N/A
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Are MS/MSD within QC criteria? QC limits are not applicable to sample results greater than 4 times spike amount. (see Table 4 and 4A)	Yes.

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Anions by EPA Method 300.0	
Description	Notes and Qualifiers
Is LCS/LCSD within QC criteria (see Table 5 and	Yes.
5A)? If out, and the recovery high with no positive	
values, then no data qualification is required.	
Is initial calibration for target compounds within	Yes.
QC limits? Is initial calibration verification within	
QC limits?	
Is continuing calibration verification for target	Yes.
compounds within QC limits?	
Were any samples reanalyzed or diluted (see	No.
Table 6)? For any sample reanalysis or dilutions,	
is only one reportable result flagged?	
Do field duplicate results show good precision for	Yes.
all compounds (see Table 7)?	

Nitrate/Nitrite by EPA Method 353.2	
Description	Notes and Qualifiers
Any compounds present in method, continuing calibration, and/or field blanks (see Table 2)?	No.
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	No qualification required.
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Is MS/MSD within QC criteria (see Table 4 and 4A)? If out and LCS is compliant, then "J" flag positive data in original sample due to matrix.	The nitrate/nitrite recovery in samples 0620RS01, 0620RD05SW, 0620MW28GW, 0620MW06GW, 0620MW100GW, and 0620MW46GW were low in the MS and MSD. The results in the parent sample were non-detect in samples 0620RS01, 0620RD05SW, 0620MW28GW, and 0620MW06GW and UJ qualified as estimated non-detect. The results in the parent sample were detected in samples 0620MW100GW and 0620MW46GW and J qualified as estimated.
Is LCS/LCSD within QC criteria (see Table 5 and 5A)? If out, and the recovery is high with no positive values, then no data qualification is required.	Yes.
Is initial calibration for target compounds within QC limits? Is initial calibration verification within QC limits?	Yes.
Is continuing calibration verification for target compounds within QC limits?	Yes.
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	Yes.

Total Suspended Solids by Standard Method 2540C/2540D							
Description	Notes and Qualifiers						
Are any compounds present in method blanks as noted on Table 2?	No.						
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	No qualification required.						

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Total Suspended Solids by Standard Method 2540C/2540D						
Description	Notes and Qualifiers					
Is laboratory QC frequency one blank and LCS	Yes.					
with each batch of 20 or fewer samples and one						
laboratory duplicate per 10 samples?						
Is LCS within QC criteria (see Table 5)? If out,	Yes.					
and the recovery high with no positive values,						
then no data qualification is required.						
Are laboratory duplicates within QC limits?	Yes.					
Do field duplicate results show good precision for	Yes.					
all compounds (see Table 8)?						

Total Organic Carbon by Method SW-846 9060B	
Description	Notes and Qualifiers
Are any compounds present in method and field blanks as noted on Table 2?	No.
For samples, if results are < 5 times the blank then "U" flag data (see Table 2A and 2B).	No qualification required.
Is laboratory QC frequency one blank and LCS with each batch of 20 or fewer samples and one set of MS and one laboratory duplicate per 20 samples?	Yes.
Are MS/MSD within QC criteria (see Table 3 and 3A)? QC limits are not applicable to sample results greater than 4 times spike amount.	Yes.
Are laboratory duplicates within QC limits?	Yes.
Is LCS/LCSD within QC criteria (see Table 4 and 4A)? If out, and the recovery high with no positive values, then no data qualification is required.	No. TOC was recovered above the acceptance criteria in LCSD 580-332532/35. The sample results for 0620RD05SW, 0620RD06SW, 0620RD08SW, 0620RD10SW, 0620RD15SW, and 0620RD99SW were J qualified as estimated.
Is initial calibration for target compounds within QC limits? Is initial calibration verification within QC limits?	Yes.
Is continuing calibration verification for target compounds within QC limits?	Yes.
Were any samples reanalyzed or diluted (see Table 6)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 7)?	Yes.

Summary of Potential Impacts on Data Usability

Concerns

6020B

• The nickel result in five samples were detected at a value less than 5X the blank detection (580-331582/20-A) and U qualified as non-detect.

6010D

 Calcium and magnesium exhibited recovery above the acceptance criteria for samples 0620RD10SW (dissolved) and 0620MW06GW. The sample results were J qualified as estimated.

353.2

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Summary of Potential Impacts on Data Usability

Concerns

• The nitrate/nitrite recovery in samples 0620RS01, 0620RD05SW, 0620MW28GW, 0620MW06GW, 0620MW100GW, and 0620MW46GW were low in the MS and MSD. The results in the parent sample non-detect in samples were UJ qualified as estimated non-detect. The results in the parent sample were detected were J qualified as estimated.

9060

 TOC was recovered above the acceptance criteria in LCSD 580-332532/35. The sample results for 0620RD05SW, 0620RD06SW, 0620RD08SW, 0620RD10SW, 0620RD15SW, and 0620RD99SW were J qualified as estimated.

2320B

 Alkalinity/Bicarbonate Alkalinity as CaCO3 exhibited poor precision between the parent sample and duplicate sample for samples 0620MW52GW and 0620MW100GW. The sample results were J qualified as estimated values.

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Table 2 – List of Positive Results for Blank Samples

Method	Sample ID	Sample Type	Analyte	Result	Qualifier	Units	MDL	PQL
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	J	mg/L	0.00062	0.015
6020B	MB 580-331580/11-A	MB	Nickel	0.000713	J	mg/L	0.00062	0.015

Table 2A – List of Samples Qualified for Method Blank Contamination

Method	Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qualifier	PQL	Affected Samples	Sample Flag
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.016	В	0.015	0620RD05SW	None
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	.001	JB	0.015	0620RD06SW	U Flag
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.0011	JB	0.015	0620RD08SW	U Flag
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.027	В	0.015	0620MW27GW	None
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.0079	JB	0.015	0620MW28GW	J Flag
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.019	В	0.015	0620MW42GW	None
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.0084	JB	0.015	0620MW56GW	J Flag
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.095	В	0.015	0620MW40GW	None
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.0028	JB	0.015	0620MW44GW	U Flag
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.00084	JB	0.015	0620MW45GW	U Flag
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	0.001	JB	0.015	0620MW51GW	U Flag
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	ND		0.015	0620RS01	None
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	ND		0.015	0620RD10SW	None
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	ND		0.015	0620RD15SW	None
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	ND		0.015	0620RD99SW	None
6020B	MB 580-331582/20-A	MB	Nickel	0.00101	ND		0.015	0620MW17GW	None

Table 2B – List of Samples Qualified for Field Blank Contamination $\ensuremath{\text{N/A}}$

Table 3 – List of Samples with Surrogates outside Control Limits $\ensuremath{\text{N/A}}$

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Table 4 - List of MS/MSD Recoveries outside Control Limits

		Sample		Orig.	Spike			Low	High	Sample
Method	Sample ID	Type	Analyte	Result	Amount	MS	MSD	Limit	Limit	Qualifier
353.2	0620RS01	MS/MSD	Nitrate-Nitrite as N	ND	0.500	71	69	90	110	UJ Flag
353.2	0620RD05SW	MS/MSD	Nitrate-Nitrite as N	ND	0.500	36	28	90	110	UJ Flag
353.2	0620MW28GW	MS/MSD	Nitrate-Nitrite as N	ND	0.500	53	54	90	110	UJ Flag
353.2	0620MW06GW	MS/MSD	Nitrate-Nitrite as N	ND	0.500	20	19	90	110	UJ Flag
353.2	0620MW100GW	MS/MSD	Nitrate-Nitrite as N	1.6	0.500	58	61	90	110	J Flag
353.2	0620MW46GW	MS/MSD	Nitrate-Nitrite as N	0.56	0.500	80	77	90	110	J Flag

Table 4A - List of RPDs outside Control Limits

	Sample Type				RPD	
Method		Sample ID	Analyte	RPD	Limit	Sample Qualifier
6010D	DUP	0620RD10SW	Sodium	49	20	None < 5x PQL
6020B	DUP	0620RD10SW	Arsenic	23	20	None < 5x PQL
6020B	DUP	0620RD10SW	Nickel	43	20	None < 5x PQL

Table 5 - List of LCS Recoveries outside Control Limits

Method	Sample ID	Analyte	Rec.	Low Limit	High Limit	Sample Qualifier
9060	LCSD 580-332532/35	TOC	144	85	115	J Flag

Table 5A – List of RPDs outside Control Limits

None.

Table 6 - List of Serial Dilution Recoveries outside Control Limits

Method	Sample ID	Analyte	Orig. Result	Serial Dilution Result	MDL	%D	Sample Qualifier
6010D	0620RD10SW	Calcium	18	20.3	0.16	12	J Flag
6010D	0620RD10SW	Magnesium	10	11.4	0.13	13	J Flag
6010D	0620MW06GW	Calcium	33	37.9	0.16	16	J Flag
6010D	0620MW06GW	Magnesium	31	35.4	0.13	16	J Flag

Table 7 - Samples that were Re-analyzed

None.

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Table 8 – Summary of Field Duplicate Results

Method	Analyte	Unit	Matrix	PQL	0620MW55GW	0620MW102GW	RPD	RPD Rating
SM 2320B	Alkalinity	mg/L	WG	5	120	120	0.0%	Good
SW846 6020B	Antimony	mg/L	WG	0.004	0.0092	0.0087	5.6%	Good
SW846 6020B	Arsenic	mg/L	WG	0.005	0.025	0.022	12.8%	Good
SW846 6020B	Barium	mg/L	WG	0.006	0.11	0.11	0.0%	Good
SM 2320B	Bicarbonate Alkalinity as CaCO3	mg/L	WG	5	120	120	0.0%	Good
SW846 6010D	Calcium	mg/L	WG	1.1	27	26	3.8%	Good
SW846 6020B	Cobalt	mg/L	WG	0.002	0.0066	0.0061	7.9%	Good
SW846 6010D	Iron	mg/L	WG	0.5	20	20	0.0%	Good
SW846 6010D	Magnesium	mg/L	WG	1.1	19	19	0.0%	Good
SW846 6020B	Manganese	mg/L	WG	0.01	1.7	1.6	6.1%	Good
SW846 6020B	Nickel	mg/L	WG	0.015	0.0097	0.0092	5.3%	Good
SW846 6010D	Potassium	mg/L	WG	3.3	0.76	0.75	1.3%	Good
SW846 6010D	Sodium	mg/L	WG	2	6.1	5.8	5.0%	Good
SM SM 2540D	Total Suspended Solids	mg/L	WG	2	39	34	13.7%	Good
SW846 6020B	Vanadium	mg/L	WG	0.02	0.0034	0.0034	0.0%	Good

Method	Analyte	Unit	Matrix	PQL	0620MW52GW	0620MW100GW	RPD	RPD Rating	Sample Qual
SM 2320B	Alkalinity	mg/L	WG	5	51	26	64.9%	Poor	J Flag
SW846 6020B	Antimony	mg/L	WG	0.004	ND	0.00081	NC	Poor	< 5X PQL
SW846 6020B	Arsenic	mg/L	WG	0.005	0.0078	0.0073	6.6%	Good	None
SW846 6020B	Barium	mg/L	WG	0.006	0.01	0.0086	15.1%	Good	None
SM 2320B	Bicarbonate Alkalinity as CaCO3	mg/L	WG	5	51	26	64.9%	Poor	J Flag
SW846 6010D	Calcium	mg/L	WG	1.1	13	13	0.0%	Good	None
SW846 6020B	Chromium	mg/L	WG	0.004	0.0015	ND	NC	Poor	< 5X PQL
SW846 6020B	Cobalt	mg/L	WG	0.002	0.00053	0.00052	1.9%	Good	None
SW846 6010D	Magnesium	mg/L	WG	1.1	7.3	7.4	1.4%	Good	None
SW846 6020B	Manganese	mg/L	WG	0.01	0.033	0.03	9.5%	Good	None
SW846 6020B	Nickel	mg/L	WG	0.015	0.0022	0.0021	4.7%	Good	None
MCAWW 353.2	Nitrate Nitrite as N	mg/L	WG	0.15	1.6	1.6	0.0%	Good	None

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SW846 6010D	Sodium	mg/L	WG	2	2.9	2.9	0.0%	Good	None
SM 2540D	Total Suspended Solids	mg/L	WG	2	2.6	ND	NC	Poor	< 5X PQL
SW846 6020B	Vanadium	mg/L	WG	0.02	0.0041	0.0023	56.3%	Poor	< 5X PQL

Method	Analyte	Unit	Matrix	PQL	0620MW48GW	0620MW101GW	RPD	RPD Rating	Sample Qual
SM 2320B	Alkalinity	mg/L	WG	5	82	67	20.1%	Good	None
SW846 6020B	Antimony	mg/L	WG	0.004	0.002	0.00066	100.8%	Poor	< 5X PQL
SW846 6020B	Arsenic	mg/L	WG	0.005	0.0015	ND	NC	Poor	< 5X PQL
SW846 6020B	Barium	mg/L	WG	0.006	0.034	0.033	3.0%	Good	None
SM 2320B	Bicarbonate Alkalinity as CaCO3	mg/L	WG	5	82	67	20.1%	Good	None
SW846 6010D	Calcium	mg/L	WG	1.1	16	15	6.5%	Good	None
SW846 6010D	Magnesium	mg/L	WG	1.1	14	14	0.0%	Good	None
SW846 6020B	Manganese	mg/L	WG	0.01	0.0097	ND	NC	Poor	< 5X PQL
MCAWW 353.2	Nitrate Nitrite as N	mg/L	WG	0.15	1.6	1.5	6.5%	Good	None
SW846 6010D	Potassium	mg/L	WG	3.3	0.43	0.41	4.8%	Good	None
SW846 6010D	Sodium	mg/L	WG	2	1.8	1.8	0.0%	Good	None
SW846 6020B	Vanadium	mg/L	WG	0.02	0.0035	0.0036	2.8%	Good	None

Method	Analyte	Unit	Matrix	PQL	0620MW48GW	0620MW100GW	RPD	RPD Rating	Sample Qual
SM 2320B	Alkalinity	mg/L	WG	5	67	65	3.0%	Good	None
SW846 6020B	Antimony	mg/L	WG	0.004	0.04	0.042	4.9%	Good	None
SW846 6020B (Dissolved)	Antimony	mg/L	WG	0.004	0.039	0.037	5.3%	Good	None
SW846 6020B	Arsenic	mg/L	WG	0.005	0.014	0.014	0.0%	Good	None
SW846 6020B (Dissolved)	Arsenic	mg/L	WG	0.005	0.012	0.012	0.0%	Good	None
SW846 6020B	Barium	mg/L	WG	0.006	0.025	0.026	3.9%	Good	None
SW846 6020B (Dissolved)	Barium	mg/L	WG	0.006	0.023	0.023	0.0%	Good	None
SM 2320B	Bicarbonate Alkalinity as CaCO3	mg/L	WG	5	67	65	3.0%	Good	None
SW846 6010D	Calcium	mg/L	WG	1.1	17	18	5.7%	Good	None
SW846 6010D (Dissolved)	Calcium	mg/L	WG	1.1	17	17	0.0%	Good	None
SW846 6010D	Magnesium	mg/L	WG	1.1	9.6	10	4.1%	Good	None

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SW846 6010D (Dissolved)	 Magnesium	mg/L	WG	1.1	9.7	9.4	3.1%	Good	None
SW846 6020B	Manganese	mg/L	WG	0.01	0.015	0.016	6.5%	Good	None
SW846 6020B (Dissolved)	Manganese	mg/L	WG	0.01	0.015	0.013	14.3%	Good	None
SW846 7470A	Mercury	mg/L	WG	0.0003	0.00026	ND	NC	Poor	< 5X PQL
SW846 6020B (Dissolved)	Nickel	mg/L	WG	0.015	0.00081	0.00074	9.0%	Good	None
MCAWW 353.2	Nitrate Nitrite as N	mg/L	WG	0.15	0.095	0.095	0.0%	Good	None
SW846 6010D	Sodium	mg/L	WG	2	1.5	2	28.6%	Good	None
SW846 6010D (Dissolved)	Sodium	mg/L	WG	2	1.9	1.8	5.4%	Good	None
SW846 9060	Total Organic Carbon	mg/L	WG	1.5	1.6	1.7	6.1%	Good	None
SW846 6020B	Vanadium	mg/L	WG	0.02	0.0033	0.0036	8.7%	Good	None
SW846 6020B (Dissolved)	Vanadium	mg/L	WG	0.02	0.0025	0.0024	4.1%	Good	None

Acronym List and Table Key:

CCB = continuing calibration blank

CCV = continuing calibration verification

CCVL = reporting limit continuing calibration verification

COC = chain of custody

CRDL = contract required detection limits

DRO = diesel range organics

DUSR = data usability summary report

FD = field duplicate

GRO = gasoline range organics ICB = initial calibration blank

ICS = interference check standard ICV = initial calibration verification

ICVL = reporting limit initial calibration verification

LCS = laboratory control sample

LCSD = laboratory control sample duplicate

LR = laboratory replicate
MB = method blank
MS = matrix spike

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MSD = matrix spike duplicate

N = normal sample ND = not detected

PDS = post-digestion spike PQL = practical quantitation limit

QA = quality assurance

QAPP = quality assurance project plan

QC = quality control RB = rinsate blank RL = reporting limit

RPD = relative percent difference
RSD = relative standard deviation
SDG = sample delivery group
TSS = total suspended solids

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- Final Quality Assurance Project Plan, Baseline Monitoring, Red Devil mine, Alaska. May 2019.
- National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001, January 2017.

Specific criteria for QC limits were obtained from the site specific QAPP. Compliance with the project QA program is indicated in the checklist and tables below. Any major or minor concerns affecting data usability are listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Laboratory	Sample Delivery Group	Project Code
Test America, Seattle	580-95652-1	1001095.0026.06

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	QC	ID Corrections
580-95652-1	WH	0620RS02	580-95652-1	6/22/2020			
580-95652-1	WG	0620MW43GW	580-95652-2	6/23/2020			
580-95652-1	WG	0620MW59GW	580-95652-3	6/22/2020			

SDG	Matrix	Test Method	Number of Samples	Sample Type
580-95586-1	WG	6010D – Metals ICP (Al, Ca, Fe, Mg, K, Na)	2	N
580-95586-1	WH	6010D – Metals ICP (Al, Ca, Fe, Mg, K, Na)	1	RB
580-95586-1	WG	6020A – Metals ICP/MS	2	N
580-95586-1	WH	6020A – Metals ICP/MS	1	RB
580-95586-1	WG	7470A – Mercury	2	N
580-95586-1	WH	7470A – Mercury	1	RB
580-95586-1	WG	7470A – Mercury	1	LR
580-95586-1	WG	7470A – Mercury	1	MS/MSD
580-95586-1	WG	353.2 - Nitrogen, Nitrate-Nitrite	2	N
580-95586-1	WH	353.2 - Nitrogen, Nitrate-Nitrite	1	RB
580-95586-1	WG	353.2 - Nitrogen, Nitrate-Nitrite	1	LR
580-95586-1	WG	353.2 - Nitrogen, Nitrate-Nitrite	1	MS/MSD
580-95586-1	WG	SM2320B – Alkalinity	2	N
580-95586-1	WH	SM2320B – Alkalinity	1	RB
580-95586-1	WG	SM2540D – Total Suspended Solids (TSS)	2	N
580-95586-1	WH	SM2540D – Total Suspended Solids (TSS)	1	RB

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General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	No. Samples 0620RS02, 0620MW43GW, and 0620MW59GW did not include sample collection time documented on the chain of custody.
Did coolers arrive at lab between 2 and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Temperature of the cooler was below acceptable criteria. However, samples arrived in good condition and with no observation of samples being frozen. No qualification was made.
Frequency of Field QC Samples Correct? Field Duplicate - 1/10 regular samples for each matrix and sampling method and/or type of equipment used. MS/MSD - 1/20 samples for each matrix and each sampling event. Equipment Blank - 1/20 field samples for each collection/decontamination method, by matrix and by sample type.	One rinsate blank collected on dedicated sample pump bladders. Field QC was included in SDG 580-95586-1.
Case narrative present and complete?	Yes.
Any holding time violations?	No.

- Method Blanks Results (Table 2, 2A, and 2B)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4 and 4A)
- LCS Outside Limits (Table 5 and 5A)
- Serial Dilution Outside Limits (Table 6)
- Reanalysis Results (Table 7)
- Field Duplicate Results (Table 8)

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Metals by Method SW-846 6010C		
Description	Notes and Qualifiers	
Are any compounds present in method and field blanks as noted on Table 2?	No.	
For samples, if results are < 5 times the blank then "U" flag data (see Table 2A and 2B).	N/A	
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.	
Are MS/MSD within QC criteria (see Table 4 and 4A)? QC limits are not applicable to sample results greater than 4 times spike amount.	Client specific QC was not run with this SDG.	
Is LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes.	
Is initial calibration ≥ 0.998 and RSD between multiple exposures ≤5%? Minimum 4-point linearity.	The r value was not reported by the laboratory. The data are considered acceptable for use.	
Is there one serial dilution per 20 samples? Flag all data reported with an "E" as "J".	Yes.	
Are serial dilutions within QC criteria (see Table 6)?	Yes.	
Spot check ICS recoveries 80-120%.	The ICSs were within acceptance criteria.	
Spot check ICV 90-110%.	The ICVs were within acceptance criteria.	
Spot check CCV 90-110%.	The CCVs were within acceptance criteria.	
Spot check ICVL/CCVL 70-130%	The ICVL/CCVLs were within acceptance criteria.	
Spot check ICB/CCB detections (see Table 2A and 2B).	Yes.	
Spot check the internal standard recoveries 50-150%.	The internal standards were acceptable.	
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.	
Do field duplicate results show good precision for all compounds (see Table 8)?	Yes.	

Metals by Method SW-846 6020B	
Description	Notes and Qualifiers
Are any compounds present in method and field	No.
blanks as noted on Table 2?	
For samples, if results are < 5 times the blank	No qualification required.
then "U" flag data (see Table 2A and 2B).	
Is laboratory QC frequency one blank and LCS	Yes.
with each batch and one set of MS/MSD per 20	
samples?	
Are MS/MSD within QC criteria (see Table 4 and	Client specific QC was not run with this SDG.
4A)? QC limits are not applicable to sample	
results greater than 4 times spike amount.	
Is LCS within QC criteria (see Table 5)? If out,	Yes.
and the recovery high with no positive values,	
then no data qualification is required.	
Is initial calibration ≥ 0.995? Minimum 5-point	The r value was not reported by the laboratory.
linearity.	The data are considered acceptable for use.

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Metals by Method SW-846 6020B		
Description	Notes and Qualifiers	
Is there one serial dilution per 20 samples? Flag	Yes.	
all data reported with an "E" as "J".		
Are serial dilutions within QC criteria (see Table	Yes.	
6)?		
Spot check ICS recoveries 80-120%.	The ICSs were within acceptance criteria.	
Spot check ICV 90-110% and < 20% RSD.	The ICVs were within acceptance criteria.	
Spot check CCV 90-110%.	The CCVs were within acceptance criteria.	
Spot check ICVL/CCVL 50-150%.	The ICVL/CCVLs were within acceptance criteria.	
Spot check ICB/CCB detections (see Table 2A	Yes.	
and 2B).		
Spot check the internal standards – must be 30-	The internal standards were acceptable.	
120% of the intensity of the calibration blank.		
Were any samples reanalyzed or diluted (see	Yes.	
Table 7)? For any sample reanalysis or dilutions,	All samples were diluted at 5-folds.	
is only one reportable result flagged?		
Do field duplicate results show good precision for	N/A	
all compounds (see Table 8)?		

Mercury by Method SW-846 7470A	
Description	Notes and Qualifiers
Any compounds present in method or field blanks	No.
(see Table 2)?	
For samples, if results are < 5 times the blank,	No qualification required.
then "U" flag data (see Table 2A and 2B).	
Is Laboratory QC frequency at least one blank,	Yes.
LCS and MS/MSD with each batch?	
Is MS/MSD within QC criteria (see Table 4 and	Client specific QC was not run with this SDG;
4A)? If out and LCS is compliant, then "J" flag	however, laboratory ran sample 0620MW43GW
positive data in original sample due to matrix.	for QC and was within acceptable limits.
Is LCS within QC criteria (see Table 5)? If out,	Yes.
and the recovery is high with no positive values,	
then no data qualification is required.	
Is initial calibration ≥ 0.995?	Yes.
Spot check ICV 90-110%.	The ICVs were acceptable.
Spot check CCV 80-120%.	The CCVs were acceptable.
Spot check ICB/CCB detections (see Table 2A	The CCBs were acceptable.
and 2B).	
Were any samples reanalyzed or diluted (see	No.
Table 7)? For any sample reanalysis or dilutions,	
is only one reportable result flagged?	
Do field duplicate results show good precision for	N/A
all compounds (see Table 8)?	

Alkalinity by Standard Method 2320B	
Description	Notes and Qualifiers
Are any compounds present in method and/or field blanks as noted on Table 2?	Method blanks are not applicable to this technique.
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	N/A
Is laboratory QC frequency at least one LCS and duplicate with each batch of up to 20 samples?	Unable to determine from the report. If a duplicate sample was analyzed, it was not performed on a client specific sample.

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Alkalinity by Standard Method 2320B	
Description	Notes and Qualifiers
Is LCS/LCSD within QC criteria (see Table 5 and	Yes.
5A)? If out, and the recovery high with no positive	
values, then no data qualification is required.	
Is initial calibration verification within QC limits?	Yes.
Is continuing calibration within QC limits?	Yes.
Are laboratory duplicates within QC limits?	Yes.
Do field duplicate results show good precision for	N/A
all compounds (see Table 8)?	

Nitrate/Nitrite by EPA Method 353.2	
Description	Notes and Qualifiers
Any compounds present in method, continuing	No.
calibration, and/or field blanks (see Table 2)?	
For samples, if results are < 5 times the blank,	No qualification required.
then "U" flag data (see Table 2A and 2B).	
Is laboratory QC frequency one blank and LCS	Yes.
with each batch and one set of MS/MSD per 20	
samples?	
Is MS/MSD within QC criteria (see Table 4 and	Client specific QC was not run with this SDG;
4A)? If out and LCS is compliant, then "J" flag	however, laboratory ran sample 0620RS02 for QC
positive data in original sample due to matrix.	and was within acceptable limits.
Is LCS/LCSD within QC criteria (see Table 5 and	Yes.
5A)? If out, and the recovery is high with no	
positive values, then no data qualification is	
required.	
Is initial calibration for target compounds within	Yes.
QC limits? Is initial calibration verification within	
QC limits?	
Is continuing calibration verification for target	Yes.
compounds within QC limits?	
Were any samples reanalyzed or diluted (see	No.
Table 7)? For any sample reanalysis or dilutions,	
is only one reportable result flagged?	
Do field duplicate results show good precision for	N/A
all compounds (see Table 8)?	

Total Suspended Solids by Standard Method 2540D	
Description	Notes and Qualifiers
Are any compounds present in method blanks as noted on Table 2?	No.
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	No qualification required.
Is laboratory QC frequency one blank and LCS with each batch of 20 or fewer samples and one laboratory duplicate per 10 samples?	Yes.
Is LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes.
Are laboratory duplicates within QC limits?	Unable to determine from the report. If a duplicate sample was analyzed, it was not performed on a client specific sample.

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Total Suspended Solids by Standard Method 2540D	
Description	Notes and Qualifiers
Do field duplicate results show good precision for	N/A
all compounds (see Table 8)?	

mary of Potential Impacts on Data Usability
cerns
No data usability issues observed.

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Table 2 – List of Positive Results for Blank Samples

None.

Table 2A – List of Samples Qualified for Method Blank Contamination

None.

Table 2B – List of Samples Qualified for Field Blank Contamination

N/A

Table 3 – List of Samples with Surrogates outside Control Limits

N/A

Table 4 - List of MS/MSD Recoveries outside Control Limits

None.

Table 4A - List of RPDs outside Control Limits

None.

Table 5 - List of LCS Recoveries outside Control Limits

None.

Table 5A - List of RPDs outside Control Limits

None.

Table 6 - List of Serial Dilution Recoveries outside Control Limits

N/A

Table 7 - Samples that were Re-analyzed

None.

Table 8 - Summary of Field Duplicate Results

N/A

Acronym List and Table Key:

CCB = continuing calibration blank

CCV = continuing calibration verification

CCVL = reporting limit continuing calibration verification

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COC = chain of custody

CRDL = contract required detection limits

DRO = diesel range organics

DUSR = data usability summary report

FD = field duplicate

GRO = gasoline range organics
ICB = initial calibration blank
ICS = interference check standard
ICV = initial calibration verification

ICVL = reporting limit initial calibration verification

LCS = laboratory control sample

LCSD = laboratory control sample duplicate

LR = laboratory replicate
MB = method blank
MS = matrix spike

MSD = matrix spike duplicate

N = normal sample ND = not detected

PDS = post-digestion spike PQL = practical quantitation limit

QA = quality assurance

QAPP = quality assurance project plan

QC = quality control RB = rinsate blank RL = reporting limit

RPD = relative percent difference
RSD = relative standard deviation
SDG = sample delivery group
TSS = total suspended solids

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- Final Quality Assurance Project Plan, Baseline Monitoring, Red Devil mine, Alaska. May 2019.
- National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001, January 2017.

Specific criteria for QC limits were obtained from the site specific QAPP. Compliance with the project QA program is indicated in the checklist and tables below. Any major or minor concerns affecting data usability are listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Laboratory	Sample Delivery Group	Project Code
Brooks Applied Labs	2027020 EEI-SE1802	1001095.0026.06

Work						
Order	Matrix	Sample ID	Lab ID	Sample Date	QC	Comment
2027020	WQ	0620EB01	2027020-01	06/24/2020		Dissolved
2027020	WQ	0620FB01	2027020-05	06/16/2020		
2027020	WQ	0620FB02	2027020-06	06/17/2020		
2027020	WQ	0620FB03	2027020-77	06/18/2020		
2027020	WQ	0620FB04	2027020-07	06/19/2020		
2027020	WQ	0620FB05	2027020-08	06/20/2020		
2027020	WQ	0620FB06	2027020-09	06/21/2020		
2027020	WQ	0620FB07	2027020-02RE1	06/22/2020		
2027020	WQ	0620FB08	2027020-03RE1	06/23/2020		
2027020	WG	0620MW06GW	2027020-10	06/21/2020	MS/MSD	Total
2027020	WG	0620MW06GW	2027020-11	06/21/2020	MS/MSD	Dissolved
2027020	WG	0620MW100GW	2027020-12	06/20/2020		Total
2027020	WG	0620MW100GW	2027020-13	06/20/2020		Dissolved
2027020	WG	0620MW101GW	2027020-14	06/21/2020		Total
2027020	WG	0620MW101GW	2027020-15	06/21/2020		Dissolved
2027020	WG	0620MW102GW	2027020-16	06/21/2020		Total
2027020	WG	0620MW102GW	2027020-17	06/21/2020		Dissolved
2027020	WG	0620MW10GW	2027020-18	06/20/2020		Total
2027020	WG	0620MW10GW	2027020-19	06/20/2020		Dissolved
2027020	WG	0620MW16GW	2027020-20	06/21/2020	Lab QC	Total
2027020	WG	0620MW16GW	2027020-21RE1	06/21/2020		Dissolved
2027020	WG	0620MW17GW	2027020-22RE1	06/18/2020		Total
2027020	WG	0620MW17GW	2027020-23RE1	06/18/2020		Dissolved
2027020	WG	0620MW27GW	2027020-24RE1	06/18/2020		Total
2027020	WG	0620MW27GW	2027020-25RE1	06/18/2020		Dissolved
2027020	WG	0620MW28GW	2027020-26RE1	06/18/2020		Total
2027020	WG	0620MW28GW	2027020-27RE1	06/18/2020		Dissolved
2027020	WG	0620MW40GW	2027020-28RE1	06/19/2020		Total

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Work Order	Matrix	Sample ID	Lab ID	Sample Date	QC	Comment
2027020	WG	0620MW40GW	2027020-29RE1	06/19/2020	·	Dissolved
2027020	WG	0620MW42GW	2027020-30RE1	06/18/2020		Total
2027020	WG	0620MW42GW	2027020-31RE1	06/18/2020		Dissolved
2027020	WG	0620MW43GW	2027020-32RE1	06/23/2020		Total
2027020	WG	0620MW43GW	2027020-33RE1	06/23/2020		Dissolved
2027020	WG	0620MW44GW	2027020-34RE1	06/19/2020		Total
2027020	WG	0620MW44GW	2027020-35RE1	06/19/2020		Dissolved
2027020	WG	0620MW45GW	2027020-36RE1	06/19/2020		Total
2027020	WG	0620MW45GW	2027020-37	06/19/2020		Dissolved
2027020	WG	0620MW46GW	2027020-38RE1	06/21/2020	MS/MSD	Total
2027020	WG	0620MW46GW	2027020-39	06/21/2020	MS/MSD	Dissolved
2027020	WG	0620MW47GW	2027020-40	06/20/2020		Total
2027020	WG	0620MW47GW	2027020-41RE1	06/20/2020		Dissolved
2027020	WG	0620MW48GW	2027020-42	06/21/2020		Total
2027020	WG	0620MW48GW	2027020-43	06/21/2020		Dissolved
2027020	WG	0620MW50GW	2027020-44	06/20/2020		Total
2027020	WG	0620MW50GW	2027020-45	06/20/2020		Dissolved
2027020	WG	0620MW51GW	2027020-46	06/19/2020		Total
2027020	WG	0620MW51GW	2027020-47	06/19/2020		Dissolved
2027020	WG	0620MW52GW	2027020-48	06/20/2020		Total
2027020	WG	0620MW52GW	2027020-49	06/20/2020		Dissolved
2027020	WG	0620MW53GW	2027020-50	06/20/2020		Total
2027020	WG	0620MW53GW	2027020-51	06/20/2020		Dissolved
2027020	WG	0620MW54GW	2027020-52	06/21/2020		Total
2027020	WG	0620MW54GW	2027020-53	06/21/2020		Dissolved
2027020	WG	0620MW55GW	2027020-54	06/21/2020		Total
2027020	WG	0620MW55GW	2027020-55	06/21/2020		Dissolved
2027020	WG	0620MW56GW	2027020-56	06/18/2020		Total
2027020	WG	0620MW56GW	2027020-57	06/18/2020		Dissolved
2027020	WG	0620MW57GW	2027020-58	06/20/2020		Total
2027020	WG	0620MW57GW	2027020-59	06/20/2020		Dissolved
2027020	WG	0620MW58GW	2027020-60	06/20/2020		Total
2027020	WG	0620MW58GW	2027020-61	06/20/2020		Dissolved
2027020	WG	0620MW59GW	2027020-62	06/22/2020		Total
2027020	WG	0620MW59GW	2027020-63	06/22/2020		Dissolved
2027020	SW	0620RD05SW	2027020-64	06/17/2020	Lab QC	Total
2027020	SW	0620RD05SW	2027020-65RE1	06/17/2020		Dissolved
2027020	SW	0620RD06SW	2027020-66	06/17/2020		Total
2027020	SW	0620RD06SW	2027020-67	06/17/2020		Dissolved
2027020	SW	0620RD08SW	2027020-68	06/17/2020		Total
2027020	SW	0620RD08SW	2027020-69	06/17/2020		Dissolved
2027020	SW	0620RD10SW	2027020-70	06/17/2020	MS/MSD	Total

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Work Order	Matrix	Sample ID	Lab ID	Sample Date	QC	Comment
2027020	SW	0620RD10SW	2027020-71	06/17/2020	MS/MSD	Dissolved
2027020	SW	0620RD15SW	2027020-72	06/17/2020		Total
2027020	SW	0620RD15SW	2027020-73	06/17/2020		Dissolved
2027020	SW	0620RD99SW	2027020-74	06/17/2020		Total
2027020	SW	0620RD99SW	2027020-75	06/17/2020		Dissolved
2027020	WH	0620RS01	2027020-76RE1	06/16/2020		
2027020	WH	0620RS02	2027020-04RE1	06/22/2020		

SDG	Matrix	Test Method	Number of Samples	Sample Type
2027020	W	EPA 1631 – Low-Level Mercury	33	N/FD
2027020	W	EPA 1631 – Dissolved Low-Level Mercury	33	N/FD
2027020	W	EPA 1631 – Low-Level Mercury	8	FB
2027020	W	EPA 1631 – Low-Level Mercury	1	EB
2027020	W	EPA 1631 – Low-Level Mercury	2	RB

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes.
Did coolers arrive at lab between 2 and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Thermal preservation of the samples is not required per the method.
Frequency of Field QC Samples Correct? Field Duplicate - 1/20 samples MS/MSD - 1/20 samples Equipment Blank - 1/ set of samples per day?	 Three field duplicates for total and dissolved portions were collected for 24 groundwater samples. One field duplicate was collected for total and dissolved portions for 5 surface water samples. Three MS/MSD was collected 33 aqueous samples. One equipment blank was collected on dedicated field filters. Eight field blanks were collected in the field. Two pre-mob rinsate blank for new well caps and freeze protection lines.
Case narrative present and complete?	Yes.
Any holding time violations?	No.

- Method Blanks Results (Table 2, 2A, and 2B)
- MS/MSD Outside Limits (Table 3 and 3A)
- LCS Outside Limits (Table 4)
- Reanalysis Results (Table 5)
- Field Duplicate Results (Table 6)

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Mercury by EPA Method 1631				
Description	Notes and Qualifiers			
Any compounds present in method, trip, or field blanks (see Table 2)?	Mercury was detected in field blank 0620FB02.			
For samples, if results are < 5 times the blank, then "U" flag data (see Tables 2A and 2B).	Samples associated with field blank 0620FB02 were greater than 5X the blank detection. No qualifications were made.			
Is Laboratory QC frequency at least one blank, standard reference material (SRM) and MS/MSD with each batch?	Yes.			
Is MS/MSD within QC criteria (see Table 3 and 3A)? If out and LCS is compliant, then "J" flag positive data in original sample due to matrix.	Yes.			
Is SRM within QC criteria (see Table 4)?	Yes.			
Are the initial calibration standards recovered between 90-110?	Yes.			
Spot check ICV 85-115%.	The ICVs were acceptable. Initial calibration verification standards associated with sequence batch 2000909 (ICV1 and ICV2) were slightly above the acceptance criteria. The ICVs were re-analyzed as ICV3 and ICV4 and the re-analysis of the ICVs passed within the accepted criteria and were reported. ICV1 and ICV2 were set to non-reportable.			
Spot check CCV 77-123%.	CCVs 2000909-CCVG and 2000909-CCVH were recovered above the acceptance criteria. Samples and QC samples bracketed by these CCVs were reanalyzed and reported in later sequences. No qualifications were made.			
Spot check ICB/CCB detections.	Yes. Mercury was detected in multiple CCBs below the MDL values. No qualifications were made.			
Were any samples reanalyzed or diluted (see Table 5)? For any sample reanalysis or dilutions, is only one reportable result flagged?	Samples 0620MW47GW and 0620RS01 yielded results below the MRL. The sample was reanalyzed and reported detectable using larger aliquots. The re-analysis was reported.			
	Multiple samples were diluted as noted in Table 5 and no justification was given by laboratory in the case narrative. Samples yielding results above the calibration standard is suspected.			
Do field duplicate results show good precision for all compounds (see Table 6)?	Yes.			

Summary of Potential Impacts on Data Usability			
Concerns			
No data usability concerns.			

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Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Sample Type	Analyte	Result	Qualifier	Units	MDL	PQL
1631E	0620FB02	FB	Mercury	0.14	J	ng/L	0.13	0.40

Table 2A – List of Samples Qualified for Method Blank Contamination

None

Table 2B – List of Samples Qualified for Field Blank Contamination

Method	Field Blank	Matrix	Analyte	Blank Result	Sample Result*	Lab Qualifier	PQL	Affected Samples	Sample Flag
1631E	0620FB02	FB	Mercury	0.14	42.9/5.45		2.04	0620RD05SW	None
1631E	0620FB02	FB	Mercury	0.14	550/26.7		2.04	0620RD06SW	None
1631E	0620FB02	FB	Mercury	0.14	462/52.3		2.04	0620RD08SW	None
1631E	0620FB02	FB	Mercury	0.14	4.89/3.13		2.04	0620RD10SW	None
1631E	0620FB02	FB	Mercury	0.14	448/16.7		2.04	0620RD15SW	None
1631E	0620FB02	FB	Mercury	0.14	511/16.0		2.04	0620RD99SW	None

^{*}The results for total and dissolved mercury are provided under the "Sample Result" column.

Table 3 - List of MS/MSD Recoveries outside Control Limits

None

Table 3A – List of RPDs outside Control Limits

None

Table 4 - List of SRM Recoveries outside Control Limits

None

Table 5 – Samples that were Re-analyzed

Sample ID	Lab ID	Method	Sample Type	Action
0620MW06GW	2027020-10	1631E (Total)	N	3X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW100GW	2027020-12	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW100GW	2027020-13	1631	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.

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Sample ID	Lab ID	Method	Sample Type	Action
0620MW101GW	2027020-14	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW101GW	2027020-15	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW102GW	2027020-16	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW102GW	2027020-17	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW10GW	2027020-18	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW10GW	2027020-19	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW16GW	2027020-20	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW16GW	2027020-21RE1	1631E (Dissolved)	N	26X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW17GW	2027020-22RE1	1631E (Total)	N	5X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW17GW	2027020-23RE1	1631E (Dissolved)	N	5X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW27GW	2027020-24RE1	1631E (Total)	N	5X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW27GW	2027020-25RE1	1631E (Dissolved)	N	5X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW28GW	2027020-26RE1	1631E (Total)	N	26X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW28GW	2027020-27RE1	1631E (Dissolved)	N	5X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW42GW	2027020-30RE1	1631E (Total)	N	5X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW45GW	2027020-36RE1	1631E (Total)	N	5X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW45GW	2027020-37	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW46GW	2027020-38RE1	1631E (Total)	N	5X: Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring					
Date Completed: November 19, 2020	Completed by: Eridania Marte					

Sample ID	Lab ID	Method	Sample Type	Action
0620MW46GW	2027020-39	1631E (Dissolved)	N	3X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW47GW	2027020-40	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW48GW	2027020-42	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW48GW	2027020-43	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW50GW	2027020-44	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW50GW	2027020-45	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW51GW	2027020-46	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW51GW	2027020-47	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW52GW	2027020-48	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW52GW	2027020-49	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW53GW	2027020-50	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW53GW	2027020-51	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW54GW	2027020-52	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW55GW	2027020-54	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW55GW	2027020-55	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW56GW	2027020-56	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW57GW	2027020-58	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620MW57GW	2027020-59	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.

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Date Completed: November 19, 2020	Completed by: Eridania Marte				

Sample ID	Lab ID	Method	Sample Type	Action
0620MW59GW	2027020-62	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD05SW	2027020-64	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD05SW	2027020-65RE1	1631E (Dissolved)	N	3X: Sample was re-analyzed due to CCV being above the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000929.
0620RD06SW	2027020-66	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD06SW	2027020-67	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD08SW	2027020-68	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD08SW	2027020-69	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD10SW	2027020-70	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD10SW	2027020-71	1631E (Dissolved)	N	3X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD15SW	2027020-72	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD15SW	2027020-73	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD99SW	2027020-74	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620RD99SW	2027020-75	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0620FB07	2027020-02RE1	1631E (Total)	N	Sample was re-analyzed due to CCV being above the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000929.
0620FB08	2027020-03RE1	1631E (Total)	N	Sample was re-analyzed due to CCV being above the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000929.
0620MW40GW	2027020-28RE1	1631E (Total)	N	Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW40GW	2027020-29RE1	1631E (Dissolved)	N	Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW42GW	2027020-31RE1	1631E (Dissolved)	N	Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring					
Date Completed: November 19, 2020	Completed by: Eridania Marte					

Sample ID	Lab ID	Method	Sample Type	Action
0620MW43GW	2027020-32RE1	1631E (Total)	N	Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW43GW	2027020-33RE1	1631E (Dissolved)	N	Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW44GW	2027020-34RE1	1631E (Total)	N	Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW44GW	2027020-35RE1	1631E (Dissolved)	N	Sample was re-analyzed due to MSD being outside of the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000921.
0620MW47GW	2027020-41RE1	1631E (Dissolved)	N	Sample yielded results below the reporting limit and were re-analyzed using larger aliquots.
0620RS01	2027020-76RE1	1631E (Total)	N	Sample yielded results below the reporting limit and were re-analyzed using larger aliquots.
0620RS02	2027020-04RE1	1631E (Total)	N	Sample was re-analyzed due to CCV being above the acceptance criteria. The sample and its QC set was re-analyzed in sequence 2000929.

Table 6 – Summary of Field Duplicate Results

Method	Analyte	Unit	Matrix	PQL	Anal Type	0620MW55GW	0620MW102GW	RPD	RPD Rating	Sample Qual
1631E	Mercury, Total	ng/l	WG	2.04	Α	92.5	96.7	4.4%	Good	None
1631E	Mercury, Dissolved	ng/l	WG	2.04	Α	45.1	52.3	14.8%	Good	None

Method	Analyte	Unit	Matrix	PQL	Anal Type	0620MW52GW	0620MW100GW	RPD	RPD Rating	Sample Qual
1631E	Mercury, Total	ng/l	WG	2.04	Α	41.7	28.6	37.3%	Good	None
1631E	Mercury, Dissolved	ng/l	WG	2.04	Α	7.23	8.21	12.7%	Good	None

Method	Analyte	Unit	Matrix	PQL	Anal Type	0620MW48GW	0620MW101GW	RPD	RPD Rating	Sample Qual
1631E	Mercury, Total	ng/l	WG	2.04	Α	8.98	9.81	8.8%	Good	None
1631E	Mercury, Dissolved	ng/l	WG	2.04	Α	4.79	5.23	8.8%	Good	None

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
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Method	Analyte	Unit	Matrix	PQL	Anal Type	0620RD15SW	0620RD99SW	RPD	RPD Rating	Sample Qual
1631E	Mercury, Total	ng/l	SW	2.04	Α	448	511	13.1%	Good	None
1631E	Mercury, Dissolved	ng/l	SW	2.04	Α	16.7	16	4.3%	Good	None

CCB = continuing calibration blankCCV = continuing calibration verification

COC = chain of custody

DUSR = data usability summary report

EB = equipment blank

FB = field blank FD = field duplicate

ICB = initial calibration blank ICV = initial calibration verification

LR = laboratory replicate

MB = method blank MS = matrix spike

MSD = matrix spike duplicate

N = normal sample ND = not detected

QA = quality assurance

QAPP = quality assurance project plan

QC = quality control RB = rinsate blank

RPD = relative percent difference SDG = sample delivery group

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring			
Date Completed: November 02, 2020	Completed by: Lynne Parker			

- Final Quality Assurance Project Plan, Baseline Monitoring, Red Devil mine, Alaska. May 2019.
- National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001, January 2017.

Specific criteria for QC limits were obtained from the site specific QAPP. Compliance with the project QA program is indicated in the checklist and tables below. Any major or minor concerns affecting data usability are listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Laboratory	Sample Delivery Group	Project Code	
Test America, Seattle	580-96725-1	1001095.0026.06	

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	QC	ID Corrections
580-96725-1	WH	0820RS01	580-96725-1	8/11/2020 19:00	DUP MS/MSD		

SDG	Matrix	Test Method	Number of Samples	Sample Type
580-96725-1	WH	6020A – Metals ICP/MS	1	N
580-96725-1	WH	7470A – Mercury	1	N
580-96725-1	WH	7470A – Mercury	1	LR
580-96725-1	WH	7470A – Mercury	1	MS/MSD
580-96725-1	WH	353.2 - Nitrogen, Nitrate-Nitrite	1	N
580-96725-1	WH	353.2 - Nitrogen, Nitrate-Nitrite	1	LR
580-96725-1	WH	353.2 - Nitrogen, Nitrate-Nitrite	1	MS/MSD
580-96725-1	WH	SM2320B – Alkalinity	1	N
580-96725-1	WH	SM2540D – Total Suspended Solids (TSS)	1	N
580-96725-1	WH	SM2540D – Total Suspended Solids (TSS)	1	LR

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: November 02, 2020	Completed by: Lynne Parker

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes.
Did coolers arrive at lab between 2 and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes.
Frequency of Field QC Samples Correct? Field Duplicate - 1/10 regular samples for each matrix and sampling method and/or type of equipment used. MS/MSD - 1/20 samples for each matrix and each sampling event. Equipment Blank - 1/20 field samples for each collection/decontamination method, by matrix and by sample type.	This sample is a pre-mob rinsate blank for new well caps and freeze protection lines. No field QC required.
Case narrative present and complete?	Yes.
Any holding time violations?	No.

- Method Blanks Results (Table 2, 2A, and 2B)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4 and 4A)
- LCS Outside Limits (Table 5 and 5A)
- Serial Dilution Outside Limits (Table 6)
- Reanalysis Results (Table 7)
- Field Duplicate Results (Table 8)

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: November 02, 2020	Completed by: Lynne Parker

Metals by Method SW-846 6020B	
Description	Notes and Qualifiers
Are any compounds present in method and field blanks as noted on Table 2?	No.
For samples, if results are < 5 times the blank then "U" flag data (see Table 2A and 2B).	No qualification required.
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Unable to determine if a MS/MSD was analyzed with batch 335874; however, a LCS/LCSD was prepared with the prep batch.
Are MS/MSD within QC criteria (see Table 4 and 4A)? QC limits are not applicable to sample results greater than 4 times spike amount.	N/A
Is LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes.
Is initial calibration ≥ 0.995? Minimum 5-point linearity.	Yes.
Is there one serial dilution per 20 samples? Flag all data reported with an "E" as "J".	Unable to be determined from report.
Are serial dilutions within QC criteria (see Table 6)?	N/A
Spot check ICS recoveries 80-120%.	The ICSs were within acceptance criteria.
Spot check ICV 90-110% and < 20% RSD.	The ICVs were within acceptance criteria.
Spot check CCV 90-110%.	The CCVs were within acceptance criteria.
Spot check ICVL/CCVL 50-150%.	The ICVL/CCVLs were within acceptance criteria.
Spot check ICB/CCB detections (see Table 2A and 2B).	No ICB/CCB detections.
Spot check the internal standards – must be 30-120% of the intensity of the calibration blank.	Not applicable.
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	N/A

Mercury by Method SW-846 7470A		
Description		
Any compounds present in method or field blanks	No.	
(see Table 2)?		
For samples, if results are < 5 times the blank,	No qualification required.	
then "U" flag data (see Table 2A and 2B).		
Is Laboratory QC frequency at least one blank,	Yes.	
LCS and MS/MSD with each batch?		
Is MS/MSD within QC criteria (see Table 4 and	Yes.	
4A)? If out and LCS is compliant, then "J" flag		
positive data in original sample due to matrix.		
Is LCS within QC criteria (see Table 5)? If out,	Yes.	
and the recovery is high with no positive values,		
then no data qualification is required.		
Is initial calibration ≥ 0.995?	Yes.	
Spot check ICV 90-110%.	The ICVs were acceptable.	
Spot check CCV 80-120%.	The CCVs were acceptable.	
Spot check ICB/CCB detections (see Table 2A	No ICB/CCB detections.	
and 2B).		

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: November 02, 2020	Completed by: Lynne Parker

Mercury by Method SW-846 7470A	
Description	
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	N/A

Alkalinity by Standard Method 2320B		
Description Notes and Qualifiers		
Are any compounds present in method and/or	Method blanks are not applicable to this	
field blanks as noted on Table 2?	technique.	
For samples, if results are < 5 times the blank,	N/A	
then "U" flag data (see Table 2A and 2B).		
Is laboratory QC frequency at least one LCS and	Yes.	
duplicate with each batch of up to 20 samples?		
Is LCS/LCSD within QC criteria (see Table 5 and	Yes.	
5A)? If out, and the recovery high with no positive		
values, then no data qualification is required.		
Is initial calibration verification within QC limits?	Yes.	
Is continuing calibration within QC limits?	Yes.	
Are laboratory duplicates within QC limits?	Yes.	
Do field duplicate results show good precision for	N/A	
all compounds (see Table 8)?		

Nitrate/Nitrite by EPA Method 353.2		
Description Notes and Qualifiers		
Any compounds present in method, continuing	No.	
calibration, and/or field blanks (see Table 2)?		
For samples, if results are < 5 times the blank,	No qualification required.	
then "U" flag data (see Table 2A and 2B).		
Is laboratory QC frequency one blank and LCS	Yes.	
with each batch and one set of MS/MSD per 20		
samples?		
Is MS/MSD within QC criteria (see Table 4 and	Yes.	
4A)? If out and LCS is compliant, then "J" flag		
positive data in original sample due to matrix.		
Is LCS/LCSD within QC criteria (see Table 5 and	Yes.	
5A)? If out, and the recovery is high with no		
positive values, then no data qualification is		
required.	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Is initial calibration for target compounds within	Yes.	
QC limits? Is initial calibration verification within		
QC limits?	No.	
Is continuing calibration verification for target	Yes.	
compounds within QC limits?	N.	
Were any samples reanalyzed or diluted (see	No.	
Table 7)? For any sample reanalysis or dilutions,		
is only one reportable result flagged?	NI/A	
Do field duplicate results show good precision for	N/A	
all compounds (see Table 8)?		

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: November 02, 2020	Completed by: Lynne Parker

Total Suspended Solids by Standard Method 2540D		
Description	Notes and Qualifiers	
Are any compounds present in method blanks as	No.	
noted on Table 2?		
For samples, if results are < 5 times the blank,	No qualification required.	
then "U" flag data (see Table 2A and 2B).		
Is laboratory QC frequency one blank and LCS	Yes.	
with each batch of 20 or fewer samples and one		
laboratory duplicate per 10 samples?		
Is LCS within QC criteria (see Table 5)? If out,	Yes.	
and the recovery high with no positive values,		
then no data qualification is required.		
Are laboratory duplicates within QC limits?	Yes.	
Do field duplicate results show good precision for	N/A	
all compounds (see Table 8)?		

Summary of Potential Impacts on Data Usability		
Concerns		
•	There are no issues that impact data usability.	

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: November 02, 2020	Completed by: Lynne Parker

Table 2 - List of Positive Results for Blank Samples

None

Table 2A – List of Samples Qualified for Method Blank Contamination

None

Table 2B - List of Samples Qualified for Field Blank Contamination

N/A

Table 3 – List of Samples with Surrogates outside Control Limits

N/A

Table 4 - List of MS/MSD Recoveries outside Control Limits

None

Table 4A - List of RPDs outside Control Limits

None

Table 5 – List of LCS Recoveries outside Control Limits

None

Table 5A - List of RPDs outside Control Limits

None

Table 6 - List of Serial Dilution Recoveries outside Control Limits

None

Table 7 - Samples that were Re-analyzed

None

Table 8 - Summary of Field Duplicate Results

N/A

Acronym List and Table Key:

CCB = continuing calibration blank

CCV = continuing calibration verification

CCVL = reporting limit continuing calibration verification

COC = chain of custody

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
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CRDL = contract required detection limits

DRO = diesel range organics

DUSR = data usability summary report

FD = field duplicate

GRO = gasoline range organics ICB = initial calibration blank

ICS = interference check standard ICV = initial calibration verification

ICVL = reporting limit initial calibration verification

LCS = laboratory control sample

LCSD = laboratory control sample duplicate

LR = laboratory replicate

MB = method blank MS = matrix spike

MSD = matrix spike duplicate

N = normal sample ND = not detected

PDS = post-digestion spike

PQL = practical quantitation limit

QA = quality assurance

QAPP = quality assurance project plan

QC = quality control RB = rinsate blank RL = reporting limit

RPD = relative percent difference
RSD = relative standard deviation
SDG = sample delivery group
TSS = total suspended solids

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: November 04, 2020	Completed by: Lynne Parker

- Final Quality Assurance Project Plan, Baseline Monitoring, Red Devil mine, Alaska. May 2019.
- National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001, January 2017.

Specific criteria for QC limits were obtained from the site specific QAPP. Compliance with the project QA program is indicated in the checklist and tables below. Any major or minor concerns affecting data usability are listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Laboratory	Sample Delivery Group	Project Code
Test America, Seattle	580-97343-1	1001095.0026.06

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	QC	ID Correct -ions
580-97343-1	WG	0920MW06GW	580-97343-1	9/4/2020 13:18			
580-97343-1	WG	0920MW100GW	580-97343-2	9/4/2020 15:30			
580-97343-1	WG	0920MW101GW	580-97343-3	9/5/2020 19:10			
580-97343-1	WG	0920MW10GW	580-97343-4	9/3/2020 14:30			
580-97343-1	WG	0920MW16GW	580-97343-5	9/3/2020 17:25			
580-97343-1	WG	0920MW17GW	580-97343-6	9/3/2020 16:13			
580-97343-1	WG	0920MW27GW	580-97343-7	9/4/2020 13:45			
580-97343-1	WG	0920MW28GW	580-97343-8	9/4/2020 15:30		MS/MS D/DUP	
580-97343-1	WG	0920MW40GW	580-97343-9	9/4/2020 19:15			
580-97343-1	WG	0920MW42GW	580-97343-10	9/7/2020 18:14			
580-97343-1	WG	0920MW43GW	580-97343-11	9/5/2020 14:05			
580-97343-1	WG	0920MW44GW	580-97343-12	9/6/2020 18:15			
580-97343-1	WG	0920MW45GW	580-97343-13	9/6/2020 14:51			
580-97343-1	WG	0920MW46GW	580-97343-14	9/6/2020 13:15			
580-97343-1	WG	0920MW47GW	580-97343-15	9/6/2020 11:48			
580-97343-1	WG	0920MW48GW	580-97343-16	9/3/2020 13:57		MS/MS D/DUP	
580-97343-1	WG	0920MW50GW	580-97343-17	9/6/2020 19:00	MS/MSD/ DUP		
580-97343-1	WG	0920MW51GW	580-97343-18	9/7/2020 14:35			
580-97343-1	WG	0920MW52GW	580-97343-19	9/6/2020 12:47			
580-97343-1	WG	0920MW53GW	580-97343-20	9/6/2020 19:29	MS/ MSD		
580-97343-1	WG	0920MW54GW	580-97343-21	9/7/2020 19:10	DUP		
580-97343-1	WG	0920MW55GW	580-97343-22	9/4/2020 15:07			
580-97343-1	WG	0920MW56GW	580-97343-23	9/6/2020 15:43	DUP		
580-97343-1	WG	0920MW57GW	580-97343-24	9/5/2020 19:10			
580-97343-1	WG	0920MW58GW	580-97343-25	9/7/2020 15:20			

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: November 04, 2020	Completed by: Lynne Parker

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	QC	ID Correct -ions
580-97343-1	WG	0920MW59GW	580-97343-26	9/5/2020 17:07			
580-97343-1	WG	0920MW99GW	580-97343-27	9/3/2020 15:30			
580-97343-1	SW	0920DR05SW	580-97343-28	9/2/2020 13:47	MS//MSD /DUP		0920RD0 5SW
580-97343-1	SW	0920DR06SW	580-97343-29	9/2/2020 12:57	DUP		0920RD0 6SW
580-97343-1	SW	0920DR08SW	580-97343-30	9/2/2020 11:35			0920RD0 8SW
580-97343-1	SW	0920RD10SW	580-97343-31	9/2/2020 15:45			
580-97343-1	SW	0920RD15SW	580-97343-32	9/2/2020 14:30		MS/MS D/DUP	
580-97343-1	SW	0920RD99SW	580-97343-33	9/2/2020 15:45			

SDG	Matrix	Test Method	Number of Samples	Sample Type
580-97343-1	W	6010C – Metals ICP (Al, Ca, Fe, Mg, K, Na)	33	N
580-97343-1	W	6010C – Metals ICP (Al, Ca, Fe, Mg, K, Na)	4	FD
580-97343-1	W	6010C – Metals ICP (Al, Ca, Fe, Mg, K, Na)	3	DUP
580-97343-1	W	6010C – Metals ICP (Al, Ca, Fe, Mg, K, Na)	3	MS/MSD
580-97343-1	W	6010C – Metals ICP Dissolved (Al, Ca, Fe, Mg, K, Na)	6	N
580-97343-1	W	6010C – Metals ICP Dissolved (Al, Ca, Fe, Mg, K, Na)	4	FD
580-97343-1	W	6010C – Metals ICP Dissolved (Al, Ca, Fe, Mg, K, Na)	1	DUP
580-97343-1	W	6010C – Metals ICP Dissolved (Al, Ca, Fe, Mg, K, Na)	1	MS/MSD
580-97343-1	W	6020A – Metals ICP/MS	33	N
580-97343-1	W	6020A – Metals ICP/MS	4	FD
580-97343-1	W	6020A – Metals ICP/MS	3	DUP
580-97343-1	W	6020A – Metals ICP/MS	3	MS/MSD
580-97343-1	W	6020A – Metals ICP/MS Dissolved	6	N
580-97343-1	W	6020A – Metals ICP/MS Dissolved	4	FD
580-97343-1	W	6020A – Metals ICP/MS Dissolved	1	DUP
580-97343-1	W	6020A – Metals ICP/MS Dissolved	1	MS/MSD
580-97343-1	W	7470A – Mercury	33	N
580-97343-1	W	7470A – Mercury	4	FD
580-97343-1	W	7470A – Mercury	3	DUP
580-97343-1	W	7470A – Mercury	3	MS/MSD
580-97343-1	W	7470A – Mercury, Dissolved	6	N
580-97343-1	W	7470A – Mercury, Dissolved	4	FD
580-97343-1	W	7470A – Mercury, Dissolved	1	DUP
580-97343-1	W	7470A – Mercury, Dissolved	1	MS/MSD
580-97343-1	W	353.2 - Nitrogen, Nitrate-Nitrite	33	N
580-97343-1	W	353.2 - Nitrogen, Nitrate-Nitrite	4	FD
580-97343-1	W	353.2 - Nitrogen, Nitrate-Nitrite	1	DUP
580-97343-1	W	353.2 - Nitrogen, Nitrate-Nitrite	4	MS/MSD

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SDG	Matrix	Test Method	Number of Samples	Sample Type
580-97343-1	W	SM2320B – Alkalinity	33	N
580-97343-1	W	SM2320B – Alkalinity	4	FD
580-97343-1	W	SM2320B – Alkalinity	3	DUP
580-97343-1	W	SM2540D – Total Suspended Solids (TSS)	33	N
580-97343-1	W	SM2540D – Total Suspended Solids (TSS)	4	FD
580-97343-1	W	SM2540D – Total Suspended Solids (TSS)	2	DUP
580-97343-1	W	SM2540C – Total Dissolved Solids (TDS)	6	N
580-97343-1	W	SM2540C – Total Dissolved Solids (TDS)	4	FD
580-97343-1	W	SM2540C – Total Dissolved Solids (TDS)	1	DUP
580-97343-1	W	9060C Organic Carbon, Total (TOC)	6	N
580-97343-1	W	9060C Organic Carbon, Total (TOC)	4	FD
580-97343-1	W	9060C Organic Carbon, Total (TOC)	1	DUP
580-97343-1	W	9060C Organic Carbon, Total (TOC)	1	MS/MSD

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes. Sample names for 0920DR05SW, 0920DR06SW, and 0920DR08SW nomenclature was corrected in EDD to reflect COC. ID correction noted in Table 1.
Did coolers arrive at lab between 2 and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes. The COC did not record the time of sample collection. The laboratory logged in the samples with the time noted on the container label.
Frequency of Field QC Samples Correct? Field Duplicate - 1/10 regular samples for each matrix and sampling method and/or type of equipment used. MS/MSD - 1/20 samples for each matrix and each sampling event. Equipment Blank - 1/20 field samples for each collection/decontamination method, by matrix and by sample type.	Four field duplicates were collected. Three MS/MSDs were collected. An equipment blank was not included in this SDG. The frequency of field QC samples will be evaluated for overall samples collected.
Case narrative present and complete?	Yes.
Any holding time violations?	No.

- Method Blanks Results (Table 2, 2A, and 2B)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4 and 4A)
- LCS Outside Limits (Table 5 and 5A)
- Serial Dilution Outside Limits (Table 6)
- Reanalysis Results (Table 7)
- Field Duplicate Results (Table 8)

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Metals by Method SW-846 6010C	
Description	Notes and Qualifiers
Are any compounds present in method and field blanks as noted on Table 2?	No.
For samples, if results are < 5 times the blank then "U" flag data (see Table 2A and 2B).	No qualification required.
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Are MS/MSD within QC criteria (see Table 4 and 4A)? QC limits are not applicable to sample results greater than 4 times spike amount.	Yes. Aluminum, iron, magnesium, potassium, and sodium exhibited high recoveries in the post digestion spike of 580-97343-8. The MS and MSDs were compliant; therefore, no qualification is required. Iron and magnesium exhibited high recoveries in the post digestion spike of 580-97343-32. The MS and MSDs were compliant; therefore, no qualification is required.
Is LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes.
Is initial calibration ≥ 0.998 and RSD between multiple exposures ≤5%? Minimum 4-point linearity.	Yes.
Is there one serial dilution per 20 samples? Flag all data reported with an "E" as "J".	Yes.
Are serial dilutions within QC criteria (see Table 6)?	Yes.
Spot check ICS recoveries 80-120%.	Sodium was detected above the MDL in ISCAs 580-338376/10 and 580-338164/10, and potassium was detected above the MDL in ISCA 580-338164/10. The possibility of a false positive exists. The associated blanks were non-detect for the analytes; therefore, no qualification of the data was made for this issue.
Spot check ICV 90-110%.	The ICVs were within acceptance criteria.
Spot check CCV 90-110%.	The CCVs were within acceptance criteria.
Spot check ICVL/CCVL 70-130%	The ICVL/CCVLs were within acceptance criteria.
Spot check ICB/CCB detections (see Table 2A and 2B).	Aluminum was detected in CCB 580-338164/36. The associated sample result was greater than 5X the blank detection; therefore, no qualification was required.
Spot check the internal standard recoveries 50-150%.	The internal standards were acceptable.
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	Yes.

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Metals by Method SW-846 6020B	
Description	Notes and Qualifiers
Are any compounds present in method and field blanks as noted on Table 2?	Yes. Vanadium was detected at a concentration less than the PQL in method blank 580-338201/14-A.
For samples, if results are < 5 times the blank then "U" flag data (see Table 2A and 2B).	The dissolved vanadium results in samples 0920DR05SW, 0920DR06SW, 0920DR08SW, 0920RD10SW, 0920RD15SW, and 0920RD099SW were U qualified as non-detect.
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Are MS/MSD within QC criteria (see Table 4 and 4A)? QC limits are not applicable to sample results greater than 4 times spike amount.	Yes.
Is LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes.
Is initial calibration ≥ 0.995? Minimum 5-point linearity.	Yes.
Is there one serial dilution per 20 samples? Flag all data reported with an "E" as "J".	
Are serial dilutions within QC criteria (see Table 6)?	The total and dissolved antimony results in sample 0920RD15SW were J qualified as estimated due to serial dilutions greater than 15%.
Spot check ICS recoveries 80-120%.	The ICSs were within acceptance criteria.
Spot check ICV 90-110% and < 20% RSD.	The ICVs were within acceptance criteria.
Spot check CCV 90-110%.	The CCVs were within acceptance criteria.
Spot check ICVL/CCVL 50-150%.	The ICVL/CCVLs were within acceptance criteria.
Spot check ICB/CCB detections (see Tables 2 and 2A).	Antimony was detected in eleven CCB, and vanadium was detected in one CCB. The total antimony results in samples 0920MW55GW, 0920RD10SW, and 0920RD99SW were U qualified as non-detect. The dissolved antimony results in samples 0920DR05SW, 0920RD10SW, and 0920RD99SW were U qualified as non-detect.
Spot check the internal standards – must be 30-	N/A
120% of the intensity of the calibration blank. Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	Yes.

Mercury by Method SW-846 7470A			
Description			
Any compounds present in method or field blanks	No.		
(see Table 2)?			
For samples, if results are < 5 times the blank,	No qualification required.		
then "U" flag data (see Table 2A and 2B).			
Is Laboratory QC frequency at least one blank,	Yes.		
LCS and MS/MSD with each batch?			

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Mercury by Method SW-846 7470A	
Description	
Is MS/MSD within QC criteria (see Table 4 and	No.
4A)? If out and LCS is compliant, then "J" flag positive data in original sample due to matrix.	Mercury was recovered high in the MS of sample 0920NW28GW. The result was J qualified as estimated.
Is LCS within QC criteria (see Table 5)? If out, and the recovery is high with no positive values, then no data qualification is required.	Yes.
Is initial calibration ≥ 0.995?	Yes.
Spot check ICV 90-110%.	The ICVs were acceptable.
Spot check CCV 80-120%.	The CCVs were acceptable.
Spot check ICB/CCB detections (see Table 2A and 2B).	The CCBs were acceptable.
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	Yes.

Alkalinity by Standard Method 2320B	
Description	Notes and Qualifiers
Are any compounds present in method and/or	Method blanks are not applicable to this
field blanks as noted on Table 2?	technique.
For samples, if results are < 5 times the blank,	N/A
then "U" flag data (see Table 2A and 2B).	
Is laboratory QC frequency at least one LCS and	Yes.
duplicate with each batch of up to 20 samples?	
Is LCS/LCSD within QC criteria (see Table 5 and	Yes.
5A)? If out, and the recovery high with no positive	
values, then no data qualification is required.	
Is initial calibration verification within QC limits?	Yes.
Is continuing calibration within QC limits?	Yes.
Are laboratory duplicates within QC limits?	Yes.
Do field duplicate results show good precision for	Yes.
all compounds (see Table 8)?	

Anions by EPA Method 300.0	
Description	Notes and Qualifiers
Are any compounds present in method blanks, continuing calibration blanks (CCB), and/or field blanks?	Chloride was detected at a concentration less than the PQL in method blanks 580-338349/29 and 580-339021/11. Chloride was also detected in eight of the associated CCBs.
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	The chloride results in samples 0920MW17GW, 0920MW28GW, 0920MW48GW, 0920MW55GW, 0920RD08SW, 0920RD10SW, 0920RD15SW, and 0920RD99SW were U qualified as non-detect.
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	A MS/MSD was not prepared with batch 339178, but an LCS/LCSD was analyzed.
Are MS/MSD within QC criteria? QC limits are not applicable to sample results greater than 4 times spike amount. (see Table 4 and 4A)	Chloride was recovered high in the MS and MSD of 0920MW28GW. The sample results were U qualified due to blank contamination; therefore,

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Anions by EPA Method 300.0	
Description	Notes and Qualifiers
	the results were UJ qualified as estimated non- detect. Sulfate was recovered high in the MS and MSD of 0920MW28GW and 0920MW48GW. The sample results were J qualified as estimated.
Is LCS/LCSD within QC criteria (see Table 5 and 5A)? If out, and the recovery high with no positive values, then no data qualification is required.	Yes.
Is initial calibration for target compounds within QC limits? Is initial calibration verification within QC limits?	Yes.
Is continuing calibration verification for target compounds within QC limits?	Yes.
Were any samples reanalyzed or diluted (see Table 6)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 7)?	Yes.

Nitrate/Nitrite by EPA Method 353.2	
Description	Notes and Qualifiers
Any compounds present in method, continuing calibration, and/or field blanks (see Table 2)?	No.
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	No qualification required.
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Is MS/MSD within QC criteria (see Table 4 and 4A)? If out and LCS is compliant, then "J" flag positive data in original sample due to matrix.	Nitrate-nitrite was recovered low in samples 0920MW28GW, 0920MW48GW, and 0920MW50GW. The analyte was UJ qualified as estimated non-detect in samples 0920MW28GW and 0920MW50GW, and J qualified as estimated in sample 0920MW48GW.
Is LCS/LCSD within QC criteria (see Table 5 and 5A)? If out, and the recovery is high with no positive values, then no data qualification is required.	Yes.
Is initial calibration for target compounds within QC limits? Is initial calibration verification within QC limits?	Yes.
Is continuing calibration verification for target compounds within QC limits?	Yes.
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	Yes.

Total Organic Carbon by SW-846 9060A	
Description	Notes and Qualifiers
Any compounds present in method, continuing	Yes.
calibration, and/or field blanks (see Table 2)?	TOC was detected in CCBs 580-338140/47
, , , , , , , , , , , , , , , , , , ,	580-338140/54.

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Description	Notes and Qualifiers
For samples, if results are < 5 times the blank, then "U" flag data (see Table 2A and 2B).	The sample results in 0920RD05SW, 0920RD15SW, and 0920RD99SW were U qualified as non-detect.
Is laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Is MS/MSD within QC criteria (see Table 4 and 4A)? If out and LCS is compliant, then "J" flag positive data in original sample due to matrix.	Yes.
Is LCS/LCSD within QC criteria (see Table 5 and 5A)? If out, and the recovery is high with no positive values, then no data qualification is required.	Yes.
Is initial calibration for target compounds within QC limits? Is initial calibration verification within QC limits?	Yes.
Is continuing calibration verification for target compounds within QC limits?	Yes.
Were any samples reanalyzed or diluted (see Table 7)? For any sample reanalysis or dilutions, is only one reportable result flagged?	No.
Do field duplicate results show good precision for all compounds (see Table 8)?	Yes.

Total Suspended Solids and Total Dissolved Solids by Standard Method 2540D/2540C	
Description	Notes and Qualifiers
Are any compounds present in method blanks as	No.
noted on Table 2?	
For samples, if results are < 5 times the blank,	No qualification required.
then "U" flag data (see Table 2A and 2B).	
Is laboratory QC frequency one blank and LCS	A duplicate was not prepared with batch 337916
with each batch of 20 or fewer samples and one	for TSS analysis.
laboratory duplicate per 10 samples?	
Is LCS within QC criteria (see Table 5)? If out,	Yes.
and the recovery high with no positive values,	
then no data qualification is required.	
Are laboratory duplicates within QC limits?	Yes.
Do field duplicate results show good precision for	Yes.
all compounds (see Table 8)?	

Summary of Potential Impacts on Data Usability

Concerns

- The TOC results in 0920RD05SW, 0920RD15SW, and 0920RD99SW were U qualified as nondetect due to positive detections in the associated CCBs.
- Nitrate-nitrite was UJ qualified as estimated non-detect in samples 0920MW28GW and 0920MW50GW due to low MS/MSD recoveries.
- Nitrate-nitrite was J qualified as estimated in sample 0920MW48GW due to low MS/MSD recoveries.
- Chloride was UJ qualified as estimated non-detect in sample due to MS and MSD recoveries outside of control limits.

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Summary of Potential Impacts on Data Usability

Concerns

- Sulfate was J qualified as estimated in samples 0920MW28GW and 0920MW48GW due to high MS/MSD recoveries.
- The chloride results in samples 0920MW17GW, 0920MW28GW, 0920MW48GW, 0920MW55GW, 0920RD08SW, 0920RD10SW, 0920RD15SW, and 0920RD99SW were U qualified as non-detect due to method blank and CCB blank contamination.
- Mercury was J qualified as estimated in sample 0920NW28GW due to high MS recovery.
- The total antimony results in samples 0920MW55GW, 0920RD10SW, and 0920RD99SW were U qualified as non-detect due to blank detections in the CCB.
- The dissolved antimony results in samples 0920DR05SW, 0920RD10SW, and 0920RD99SW were U qualified as non-detect due to blank detections in the CCB.
- The total and dissolved antimony results in sample 0920RD15SW were J qualified as estimated due to serial dilutions greater than 15%.
- The dissolved vanadium results in samples 0920DR05SW, 0920DR06SW, 0920DR08SW, 0920RD10SW, 0920RD15SW, and 0920RD099SW were U qualified as non-detect due to positive detections in the method blank.

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Table 2 – List of Positive Results for Blank Samples

Method	Sample ID	Sample Type	Analyte	Result	Qualifier	Units	MDL	PQL
6010C	580-338164/36	CCB	Aluminum	0.117	J	mg/L	0.11	1.5
6020B	580-338141/47	ССВ	Antimony	0.181	J	ug/L	0.11	0.80
6020B	580-338141/61	ССВ	Antimony	0.169	J	ug/L	0.11	0.80
6020B	580-338141/74	ССВ	Antimony	0.162	J	ug/L	0.11	0.80
6020B	580-338216/12	ССВ	Antimony	0.133	J	ug/L	0.11	0.80
6020B	580-338216/25	ССВ	Antimony	0.172	J	ug/L	0.11	0.80
6020B	580-338216/37	ССВ	Antimony	0.124	J	ug/L	0.11	0.80
6020B	580-338216/50	ССВ	Antimony	0.163	J	ug/L	0.11	0.80
6020B	580-338216/62	ССВ	Antimony	0.160	J	ug/L	0.11	0.80
6020B	580-338351/40	ССВ	Antimony	0.185	J	ug/L	0.11	0.80
6020B	580-338351/40	ССВ	Vanadium	0.733	J	ug/L	0.456	4.0
6020B	580-338351/52	ССВ	Antimony	0.233	J	ug/L	0.11	0.80
6020B	580-338351/60	ССВ	Antimony	0.238	J	ug/L	0.11	0.80
6020B	580-338201/14-A	MB	Vanadium	0.00284	J	mg/L	0.00055	0.004
300.0	580-338349/2	ССВ	Chloride	0.181	J	mg/L	0.14	0.9
300.0	580-338349/33	ССВ	Chloride	0.184	J	mg/L	0.14	0.9
300.0	580-339021/10	ССВ	Chloride	0.156	J	mg/L	0.14	0.9
300.0	580-339021/45	ССВ	Chloride	0.185	J	mg/L	0.14	0.9
300.0	580-339021/8	ССВ	Chloride	0.182	J	mg/L	0.14	0.9
300.0	580-339021/50	ССВ	Chloride	0.184	J	mg/L	0.14	0.9
300.0	580-339178/30	ССВ	Chloride	0.148	J	mg/L	0.14	0.9
300.0	580-339178/39	ССВ	Chloride	0.146	J	mg/L	0.14	0.9
300.0	580-338349/29	MB	Chloride	0.184	J	mg/L	0.14	0.9
300.0	580-339021/11	MB	Chloride	0.149	J	mg/L	0.14	0.9
9060A	580-338140/47	ССВ	Total Organic Carbon	0.569	J	mg/L	0.38	1.5
9060A	580-338140/54	ССВ	Total Organic Carbon	1.03	J	mg/L	0.38	1.5

Table 2A – List of Samples Qualified for Method Blank Contamination

Method	Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qualifier	PQL	Affected Samples	Sample Flag
6010C	580-338164/36	WG	Aluminum	0.117	0.8	J	1.5	0920MW28GW	None

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Method	Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qualifier	PQL	Affected Samples	Sample Flag
6020B	580-338141/47 & 580- 338141/61	WG	Antimony, Total	0.00181 0.00169	0.011		0.80	0920MW28GW	None
6020B	580-338216/12 & 580- 338216/25	WG	Antimony, Total	0.00133 0.00172	ND		0.80	0920MW48GW	None
6020B	580-338216/12 & 580- 338216/25	WG	Antimony, Total	0.00133 0.00172	0.0065		0.80	0920MW55GW	U Flag
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	ND		0.80	0920MW56GW	None
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	ND		0.80	0920MW57GW	None
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	ND		0.80	0920MW58GW	None
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	ND		0.80	0920MW59GW	None
6020B	580-338216/37 & 580- 338216/50	WG	Antimony, Total	0.00124 0.00163	ND		0.80	0920MW99GW	None
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	0.025		0.80	0920DR05SW	None
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	0.22		0.80	0920DR06SW	None
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	0.28		0.80	0920DR08SW	None
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	0.002	J	0.80	0920RD10SW	U Flag
6020B	580-338216/37 & 580- 338216/50	WG	Antimony, Total	0.00124 0.00163	0.04		0.80	0920RD15SW	None
6020B	580-338216/50 & 580- 338216/62	WG	Antimony, Total	0.00163 0.00160	0.0019	J	0.80	0920RD99SW	U Flag
6020B	580-338351/52 & 580- 338351/60	WG	Antimony, Dissolved	0.00233 0.00238	0.0043		0.80	0920DR05SW	U Flag
6020B	580-338351/52 & 580- 338351/60	WG	Antimony, Dissolved	0.00233 0.00238	0.23		0.80	0920DR06SW	None
6020B	580-338351/52 & 580- 338351/60	WG	Antimony, Dissolved	0.00233 0.00238	0.28		0.80	0920DR08SW	None
6020B	580-338351/52 & 580- 338351/60	WG	Antimony, Dissolved	0.00233 0.00238	0.0045		0.80	0920RD10SW	U Flag

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Method	Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qualifier	PQL	Affected Samples	Sample Flag
6020B	580-338351/40 & 580- 338351/52	WG	Antimony, Dissolved	0.00185 0.00233	0.04		0.80	0920RD15SW	None
6020B	580-338351/40	WG	Vanadium, Dissolved	0.00733	0.0057	JB	0.004	0920RD15SW	U Flag
6020B	580-338351/52 & 580- 338351/60	WG	Antimony, Dissolved	0.00233 0.00238	0.0026	J	0.80	0920RD99SW	U Flag
6020B	580-338201/14-A	WG	Vanadium, Dissolved	0.00284	0.0045	JB	0.004	0920DR05SW	U Flag
6020B	580-338201/14-A	WG	Vanadium, Dissolved	0.00284	0.0051	JB	0.004	0920DR06SW	U Flag
6020B	580-338201/14-A	WG	Vanadium, Dissolved	0.00284	0.0053	JB	0.004	0920DR08SW	U Flag
6020B	580-338201/14-A	WG	Vanadium, Dissolved	0.00284	0.0049	JB	0.004	0920RD10SW	U Flag
6020B	580-338201/14-A	WG	Vanadium, Dissolved	0.00284	0.0057	JB	0.004	0920RD15SW	U Flag
6020B	580-338201/14-A	WG	Vanadium, Dissolved	0.00284	0.0052	JB	0.004	0920RD99SW	U Flag
300.0	580-338349/2	WG	Chloride	0.181	1.2			0920MW06GW	None
300.0	580-338349/2	WG	Chloride	0.181	1.2			0920MW100GW	None
300.0	580-338349/2	WG	Chloride	0.181	1.2			0920MW101GW	None
300.0	580-338349/2	WG	Chloride	0.181	1.4			0920MW10GW	None
300.0	580-338349/2	WG	Chloride	0.181	1.3			0920MW16GW	None
300.0	580-339021/45 580-339021/8	WG	Chloride	0.185 0.182	0.81	JB		0920MW17GW	U Flag
300.0	580-338349/2	WG	Chloride	0.181	1.6			0920MW27GW	None
300.0	580-338349/2	WG	Chloride	0.181	0.76	J		0920MW28GW	U Flag
300.0	580-338349/2	WG	Chloride	0.181	1.1			0920MW40GW	None
300.0	580-339021/45 580-339021/8	WG	Chloride	0.185 0.182	0.81	JB		0920MW48GW	U Flag
300.0	580-339178/30	WG	Chloride	0.148	0.96			0920MW54GW	None
300.0	580-339178/30	WG	Chloride	0.148	0.74	J		0920MW55GW	U Flag
300.0	580-339178/30	WG	Chloride	0.148	0.96			0920MW56GW	None
300.0	580-339178/30	WG	Chloride	0.148	1.1			0920MW57GW	None
300.0	580-339178/30 580-339178/39	WG	Chloride	0.148 0.146	0.81	J		0920MW58GW	None
300.0	580-338349/33	WG	Chloride	0.184	1.2			0920MW59GW	None
300.0	580-338349/33	WG	Chloride	0.184	1.1			0920MW99GW	None
300.0	580-339178/30 580-339178/39	WG	Chloride	0.148 0.146	0.8	J		0920DR05SW	None
300.0	580-339178/30	WG	Chloride	0.148	0.78	J		0920DR06SW	None

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Method	Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qualifier	PQL	Affected Samples	Sample Flag
	580-339178/39			0.146					
300.0	580-339178/30 580-339178/39	WG	Chloride	0.148 0.146	0.71	J		0920RD08SW	U Flag
300.0	580-339178/30 580-339178/39	WG	Chloride	0.148 0.146	0.67	J		0920RD10SW	U Flag
300.0	580-339178/30 580-339178/39	WG	Chloride	0.148 0.146	0.71	J		0920RD15SW	U Flag
300.0	580-339178/30 580-339178/39	WG	Chloride	0.148 0.146	0.68	J		0920RD99SW	U Flag
300.0	580-338349/29	WG	Chloride	0.184	1.2			0920MW06GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.2			0920MW100GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.2			0920MW101GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.4			0920MW10GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.3			0920MW16GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.6			0920MW27GW	None
300.0	580-338349/29	WG	Chloride	0.184	0.76	J		0920MW28GW	U Flag
300.0	580-338349/29	WG	Chloride	0.184	1.1			0920MW40GW	None
300.0	580-338349/29	WG	Chloride	0.184	0.97			0920MW42GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.1			0920MW43GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.4			0920MW44GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.2			0920MW45GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.1			0920MW46GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.2			0920MW47GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.2			0920MW50GW	None
300.0	580-338349/29	WG	Chloride	0.184	0.95			0920MW51GW	None
300.0	580-338349/29	WG	Chloride	0.184	0.99			0920MW52GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.3			0920MW53GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.2			0920MW59GW	None
300.0	580-338349/29	WG	Chloride	0.184	1.1			0920MW99GW	None
300.0	580-339021/11	WG	Chloride	0.149	0.81	JB		0920MW17GW	None
300.0	580-339021/11	WG	Chloride	0.149	0.81	JB		0920MW48GW None	
9060A	580-338140/47	WG	Total Organic Carbon	0.569	2.4		1.5	0920DR05SW	U Flag
9060A	580-338140/47	WG	Total Organic Carbon	0.569	3.3		1.5	0920DR06SW	None

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Method	Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qualifier	PQL	Affected Samples	Sample Flag
9060A	580-338140/47	WG	Total Organic Carbon	0.569	3.2		1.5	0920DR08SW	None
9060A	580-338140/47	WG	Total Organic Carbon	0.569	3.5		1.5	0920RD10SW	None
9060A	580-338140/47 580-338140/54	WG	Total Organic Carbon	0.569 1.03	3.7		1.5	0920RD15SW	U Flag
9060A	580-338140/47 580-338140/54	WG	Total Organic Carbon	0.569 1.03	3.9		1.5	0920RD99SW	U Flag

Table 2B – List of Samples Qualified for Field Blank Contamination N/A

Table 3 – List of Samples with Surrogates outside Control Limits None

Table 4 - List of MS/MSD Recoveries outside Control Limits

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	MS	MSD	Low Limit	High Limit	Sample Qualifier
7470A	0920MW28GW	N	Mercury	0.00035	0.0020	124	115	80	120	J Flag
300.0	0920MW28GW	N	Chloride	0.76	50.0	113	113	90	110	UJ Flag
300.0	0920MW28GW	N	Sulfate	46	50.0	112	112	90	110	J Flag
300.0	0920MW48GW	N	Sulfate	4.0	50.0	112	111	90	110	J Flag
353.2	0920MW28GW	N	Nitrate Nitrite	ND	0.500	60	56	90	110	UJ Flag
353.2	0920MW48GW	N	Nitrate Nitrite	1.2	0.500	72	74	90	110	J Flag
353.2	0920MW50GW	N	Nitrate Nitrite	ND	0.500	80	83	90	110	UJ Flag

Table 4A - List of RPDs outside Control Limits

Method	Sample Type	Sample ID	Analyte	RPD	RPD Limit	Sample Qualifier
7470A	DUP	0920MW28GW	Mercury	76	20	<5X PQL
6020B	DUP	0920MW48GW	Chromium	143	20	<5X PQL

Table 5 – List of LCS Recoveries outside Control LimitsNone

Table 5A – List of RPDs outside Control LimitsNone

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Table 6 - List of Serial Dilution Recoveries outside Control Limits

Method	Sample ID	Analyte	Orig. Result	Serial Dilution Result	MDL	%D	Sample Qualifier
6020B	0920RD15SW	Antimony, Total	0.040	0.0456	0.00055	15	J Flag
6020B	0920RD15SW	Antimony, Dissolved	0.040	0.0472	0.00055	19	J Flag

Table 7 – Samples that were Re-analyzed None.

Table 8 – Summary of Field Duplicate Results

Method	Analyte	Unit	Matrix	PQL	0920MW48GW	0920MW99GW	RPD	RPD Rating	Sample Qual
SM 2320B	Alkalinity	mg/L	Water	5	ND	1.1	NC		
SM 2320B	Bicarbonate Alkalinity as CaCO3	mg/L	Water	5	0.14	ND	NC		
SM 2320B	Carbonate Alkalinity as CaCO3	mg/L	Water	5	4	3.8	5.1%	Good	None
SM 2320B	Hydroxide Alkalinity as CaCO3	mg/L	Water	5	1.2	1.1	8.7%	Good	None
MCAWW 300.0	Chloride	mg/L	Water	0.9	110	100	9.5%	Good	None
MCAWW 300.0	Fluoride	mg/L	Water	0.2	110	100	9.5%	Good	None
SW846 6010D	Iron	mg/L	Water	0.5	20	20	0.0%	Good	None
SW846 6010D	Potassium	mg/L	Water	3.3	19	18	5.4%	Good	None
SW846 6010D	Sodium	mg/L	Water	2	0.44	0.42	4.7%	Good	None
SW846 6020B	Antimony	mg/L	Water	0.004	1.7	1.6	6.1%	Good	None
SW846 6020B	Beryllium	mg/L	Water	0.002	0.055	0.055	0.0%	Good	None
SW846 6020B	Cobalt	mg/L	Water	0.002	0.0073	ND	NC		
SW846 6020B	Nickel	mg/L	Water	0.015	0.012	0.009	28.6%	Poor	<5X PQL
SW846 6020B	Selenium	mg/L	Water	0.04	0.001	ND	NC		
SW846 6020B	Zinc	mg/L	Water	0.035	0.0033	0.004	19.2%	Good	None

Method	Analyte	Unit	Matrix	PQL	0920MW57GW	0920MW101GW	RPD	RPD Rating	Sample Qual
SM 2320B	Alkalinity	mg/L	Water	5	60	55	8.7%	Good	None
SM 2320B	Bicarbonate Alkalinity as CaCO3	mg/L	Water	5	60	55	8.7%	Good	None
SM 2320B	Carbonate Alkalinity as CaCO3	mg/L	Water	5	ND	ND	NC		

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SM 2320B	Hydroxide Alkalinity as CaCO3	mg/L	Water	5	ND	ND	NC		
MCAWW 300.0	Chloride	mg/L	Water	0.9	1.1	1.2	8.7%	Good	None
MCAWW 300.0	Fluoride	mg/L	Water	0.2	0.13	0.042	102.3%	Poor	<5X PQL
MCAWW 300.0	Sulfate	mg/L	Water	1.2	3.9	3.8	2.6%	Good	None
SW846 6010D	Calcium	mg/L	Water	1.1	14	14	0.0%	Good	None
SW846 6010D	Magnesium	mg/L	Water	1.1	8.6	8.7	1.2%	Good	None
SW846 6010D	Sodium	mg/L	Water	2	2.4	2.5	4.1%	Good	None
SW846 6020B	Arsenic	mg/L	Water	0.005	0.0013	0.0014	7.4%	Good	None
SW846 6020B	Barium	mg/L	Water	0.006	0.0082	0.0081	1.2%	Good	None
SW846 6020B	Chromium	mg/L	Water	0.004	0.0012	0.0013	8.0%	Good	None
SW846 6020B	Manganese	mg/L	Water	0.01	0.0051	0.011	73.3%	Poor	<5X PQL
SW846 6020B	Nickel	mg/L	Water	0.015	0.0024	0.0029	18.9%	Good	None
SW846 6020B	Vanadium	mg/L	Water	0.02	0.004	ND	NC		
MCAWW 353.2	Nitrate Nitrite as N	mg/L	Water	0.15	0.15	0.16	6.5%	Good	None

Method	Analyte	Unit	Matrix	PQL	0920RD10SW	0920RD99SW	RPD	RPD Rating	Sample Qual
SM 2320B	Alkalinity	mg/L	Water	5	85	79	7.3%	Good	None
SM 2320B	Bicarbonate Alkalinity as CaCO3	mg/L	Water	5	85	79	7.3%	Good	None
SM 2320B	Carbonate Alkalinity as CaCO3	mg/L	Water	5	ND	ND	NC		
SM 2320B	Hydroxide Alkalinity as CaCO3	mg/L	Water	5	ND	ND	NC		
MCAWW 300.0	Fluoride	mg/L	Water	0.2	0.1	0.096	4.1%	Good	None
MCAWW 300.0	Sulfate	mg/L	Water	1.2	9.6	10	4.1%	Good	None
SW846 6010D	Calcium	mg/L	Water	1.1	22	22	0.0%	Good	None
SW846 6010D	Magnesium	mg/L	Water	1.1	12	12	0.0%	Good	None
SW846 6010D	Sodium	mg/L	Water	2	1.8	1.9	5.4%	Good	None
SW846 6010D	Calcium	mg/L	Water	1.1	22	23	4.4%	Good	None
SW846 6010D	Magnesium	mg/L	Water	1.1	12	12	0.0%	Good	None
SW846 6010D	Sodium	mg/L	Water	2	2	2	0.0%	Good	None
SW846 6020B	Arsenic	mg/L	Water	0.005	0.0015	0.0016	6.5%	Good	None
SW846 6020B	Barium	mg/L	Water	0.006	0.027	0.027	0.0%	Good	None
SW846 6020B	Chromium	mg/L	Water	0.004	0.0015	ND	NC		
SW846 6020B	Manganese	mg/L	Water	0.01	0.012	0.014	15.4%	Good	None

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Method	Analyte	Unit	Matrix	PQL	0920RD10SW	0920RD99SW	RPD	RPD Rating	Sample Qual
SW846 6020B	Vanadium	mg/L	Water	0.02	0.0028	0.0029	3.5%	Good	None
SW846 6020B	Arsenic	mg/L	Water	0.005	0.002	0.0018	10.5%	Good	None
SW846 6020B	Barium	mg/L	Water	0.006	0.027	0.028	3.6%	Good	None
SW846 6020B	Manganese	mg/L	Water	0.01	0.0097	0.01	3.0%	Good	None
SW846 9060	Total Organic Carbon	mg/L	Water	1.5	3.5	ND	NC		
SM 2540C	Total Dissolved Solids	mg/L	Water	10	71	81	13.2%	Good	None

Method	Analyte	Unit	Matrix	PQL	0920MW28GW	0920MW100GW	RPD	RPD Rating	Sample Qual
SM 2320B	Alkalinity	mg/L	Water	5	190	190	0.0%	Good	None
SM 2320B	Bicarbonate Alkalinity as CaCO3	mg/L	Water	5	190	190	0.0%	Good	None
SM 2320B	Carbonate Alkalinity as CaCO3	mg/L	Water	5	ND	ND	NC		
SM 2320B	Hydroxide Alkalinity as CaCO3	mg/L	Water	5	ND	ND	NC		
MCAWW 300.0	Chloride	mg/L	Water	0.9	ND	1.2	NC		
MCAWW 300.0	Fluoride	mg/L	Water	0.2	ND	0.38	NC		
MCAWW 300.0	Sulfate	mg/L	Water	1.2	46	46	0.0%	Good	None
SW846 7470A	Mercury	mg/L	Water	3E-04	0.00035	0.001	96.3%	Poor	<5X PQL
SW846 6010D	Aluminum	mg/L	Water	1.5	0.8	0.94	16.1%	Good	None
SW846 6010D	Calcium	mg/L	Water	1.1	41	41	0.0%	Good	None
SW846 6010D	Iron	mg/L	Water	0.5	2.2	2.3	4.4%	Good	None
SW846 6010D	Magnesium	mg/L	Water	1.1	31	32	3.2%	Good	None
SW846 6010D	Potassium	mg/L	Water	3.3	1	1.1	9.5%	Good	None
SW846 6010D	Sodium	mg/L	Water	2	11	11	0.0%	Good	None
SW846 6020B	Antimony	mg/L	Water	0.004	0.011	0.012	8.7%	Good	None
SW846 6020B	Arsenic	mg/L	Water	0.005	0.13	0.13	0.0%	Good	None
SW846 6020B	Barium	mg/L	Water	0.006	0.063	0.066	4.7%	Good	None
SW846 6020B	Chromium	mg/L	Water	0.004	0.0024	0.0054	76.9%	Poor	<5X PQL
SW846 6020B	Cobalt	mg/L	Water	0.002	0.0032	0.0035	9.0%	Good	None
SW846 6020B	Manganese	mg/L	Water	0.01	0.85	0.88	3.5%	Good	None
SW846 6020B	Nickel	mg/L	Water	0.015	0.008	0.0088	9.5%	Good	None
SM 2540D	Total Suspended Solids	mg/L	Water	2	16	19	17.1%	Good	None

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Acronym List and Table Key:

CCB = continuing calibration blankCCV = continuing calibration verification

CCVL = reporting limit continuing calibration verification

COC = chain of custody

CRDL = contract required detection limits

DRO = diesel range organics

DUSR = data usability summary report

FD = field duplicate

GRO = gasoline range organics ICB = initial calibration blank

ICS = interference check standard ICV = initial calibration verification

ICVL = reporting limit initial calibration verification

LCS = laboratory control sample

LCSD = laboratory control sample duplicate

LR = laboratory replicate
MB = method blank
MS = matrix spike

MSD = matrix spike duplicate

N = normal sample ND = not detected

PDS = post-digestion spike PQL = practical quantitation limit

QA = quality assurance

QAPP = quality assurance project plan

QC = quality control RB = rinsate blank RL = reporting limit

RPD = relative percent difference RSD = relative standard deviation

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Acronym List and Table Key:

SDG = sample delivery group
TSS = total suspended solids

Data Usability Summary Report	Project: Red Devil Mine: Baseline Monitoring
Date Completed: November 5, 2020	Completed by: Eridania Marte

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness based on applicable sections of the following guidelines.

- Final Quality Assurance Project Plan, Baseline Monitoring, Red Devil mine, Alaska. May 2019.
- National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001, January 2017.

Specific criteria for QC limits were obtained from the site specific QAPP. Compliance with the project QA program is indicated in the checklist and tables below. Any major or minor concerns affecting data usability are listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Laboratory	Sample Delivery Group	Project Code
Brooks Applied Labs	2037046 EEI-SE1802	1001095.0026.06

Work						
Order	Matrix	Sample ID	Lab ID	Sample Date	QC	Comment
2037046	WQ	0920EB01	2037046-01	09/07/2020		
2037046	WQ	0920FB01	2037046-02	09/02/2020		
2037046	WQ	0920FB02	2037046-03	09/03/2020		
2037046	WQ	0920FB03	2037046-04	09/04/2020		
2037046	WQ	0920FB04	2037046-05	09/05/2020		
2037046	WQ	0920FB05	2037046-06	09/06/2020		
2037046	WQ	0920FB06	2037046-07	09/07/2020		
2037046	WG	0920MW06GW	2037046-08	09/04/2020		Total
2037046	WG	0920MW06GW	2037046-09	09/04/2020		Dissolved
2037046	WG	0920MW100GW	2037046-10RE1	09/04/2020		Total
2037046	WG	0920MW100GW	2037046-11RE1	09/04/2020		Dissolved
2037046	WG	0920MW101GW	2037046-12RE1	09/05/2020	Lab QC	Total
2037046	WG	0920MW101GW	2037046-13	09/05/2020		Dissolved
2037046	WG	0920MW10GW	2037046-14	09/03/2020		Total
2037046	WG	0920MW10GW	2037046-15	09/03/2020		Dissolved
2037046	WG	0920MW16GW	2037046-16	09/03/2020		Total
2037046	WG	0920MW16GW	2037046-17	09/03/2020		Dissolved
2037046	WG	0920MW17GW	2037046-18	09/03/2020		Total
2037046	WG	0920MW17GW	2037046-19	09/03/2020		Dissolved
2037046	WG	0920MW27GW	2037046-20	09/04/2020		Total
2037046	WG	0920MW27GW	2037046-21	09/04/2020		Dissolved
2037046	WG	0920MW28GW	2037046-22	09/04/2020	MS/MSD	Total
2037046	WG	0920MW28GW	2037046-23	09/04/2020		Dissolved
2037046	WG	0920MW40GW	2037046-24	09/04/2020		Total
2037046	WG	0920MW40GW	2037046-25	09/04/2020		Dissolved
2037046	WG	0920MW42GW	2037046-26	09/07/2020		Total
2037046	WG	0920MW42GW	2037046-27	09/07/2020		Dissolved
2037046	WG	0920MW43GW	2037046-28	09/05/2020		Total

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Work						
Order	Matrix	Sample ID	Lab ID	Sample Date	QC	Comment
2037046	WG	0920MW43GW	2037046-29	09/05/2020		Dissolved
2037046	WG	0920MW44GW	2037046-30	09/06/2020		Total
2037046	WG	0920MW44GW	2037046-31	09/06/2020		Dissolved
2037046	WG	0920MW45GW	2037046-32	09/06/2020		Total
2037046	WG	0920MW45GW	2037046-33	09/06/2020		Dissolved
2037046	WG	0920MW46GW	2037046-34	09/06/2020		Total
2037046	WG	0920MW46GW	2037046-35	09/06/2020		Dissolved
2037046	WG	0920MW47GW	2037046-36	09/06/2020		Total
2037046	WG	0920MW47GW	2037046-37	09/06/2020		Dissolved
2037046	WG	0920MW48GW	2037046-38	09/03/2020	MS/MSD	Total
2037046	WG	0920MW48GW	2037046-39	09/03/2020		Dissolved
2037046	WG	0920MW50GW	2037046-40	09/06/2020		Total
2037046	WG	0920MW50GW	2037046-41	09/06/2020		Dissolved
2037046	WG	0920MW51GW	2037046-42	09/07/2020		Total
2037046	WG	0920MW51GW	2037046-43	09/07/2020		Dissolved
2037046	WG	0920MW52GW	2037046-44	09/06/2020		Total
2037046	WG	0920MW52GW	2037046-45	09/06/2020		Dissolved
2037046	WG	0920MW53GW	2037046-46	09/06/2020		Total
2037046	WG	0920MW53GW	2037046-47	09/06/2020		Dissolved
2037046	WG	0920MW54GW	2037046-48	09/07/2020		Total
2037046	WG	0920MW54GW	2037046-49	09/07/2020		Dissolved
2037046	WG	0920MW55GW	2037046-50	09/04/2020	Lab QC	Total
2037046	WG	0920MW55GW	2037046-51	09/04/2020		Dissolved
2037046	WG	0920MW56GW	2037046-52	09/06/2020		Total
2037046	WG	0920MW56GW	2037046-53	09/06/2020		Dissolved
2037046	WG	0920MW57GW	2037046-54	09/05/2020		Total
2037046	WG	0920MW57GW	2037046-55	09/05/2020		Dissolved
2037046	WG	0920MW58GW	2037046-56	09/07/2020		Total
2037046	WG	0920MW58GW	2037046-57	09/07/2020		Dissolved
2037046	WG	0920MW59GW	2037046-58	09/05/2020		Total
2037046	WG	0920MW59GW	2037046-59	09/05/2020		Dissolved
2037046	WG	0920MW99GW	2037046-60	09/03/2020		Total
2037046	WG	0920MW99GW	2037046-61	09/03/2020		Dissolved
2037046	SW	0920RD05SW	2037046-62	09/02/2020		Total
2037046	SW	0920RD05SW	2037046-63	09/02/2020		Dissolved
2037046	SW	0920RD06SW	2037046-64	09/02/2020		Total
2037046	SW	0920RD06SW	2037046-65	09/02/2020		Dissolved
2037046	SW	0920RD08SW	2037046-66	09/02/2020		Total
2037046	SW	0920RD08SW	2037046-67	09/02/2020		Dissolved
2037046	SW	0920RD10SW	2037046-68	09/02/2020		Total
2037046	SW	0920RD10SW	2037046-69	09/02/2020		Dissolved
2037046	SW	0920RD15SW	2037046-70	09/02/2020	MS/MSD	Total

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Work Order	Matrix	Sample ID	Lab ID	Sample Date	QC	Comment
2037046	SW	0920RD15SW	2037046-71	09/02/2020		Dissolved
2037046	SW	0920RD99SW	2037046-72RE1	09/02/2020		Total
2037046	SW	0920RD99SW	2037046-73	09/02/2020		Dissolved

SDG	Matrix	Test Method	Number of Samples	Sample Type
2037046	W	EPA 1631 – Low-Level Mercury	33	N/FD
2037046	W	EPA 1631 – Dissolved Low-Level Mercury	33	N/FD
2037046	W	EPA 1631 – Low-Level Mercury	6	FB
2037046	W	EPA 1631 – Low-Level Mercury	1	EB

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes.
Did coolers arrive at lab between 2 and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Thermal preservation of the samples is not required per the method.
Frequency of Field QC Samples Correct? Field Duplicate - 1/20 samples MS/MSD - 1/20 samples Equipment Blank - 1/ set of samples per day?	 Three field duplicates for total and dissolved portions were collected for 24 groundwater samples. One field duplicate was collected for total and dissolved portions for 5 surface water samples. Three MS/MSD was collected 33 aqueous samples. One equipment blank was collected on dedicated field filters. Six field blanks were collected in the field.
Case narrative present and complete?	Yes.
Any holding time violations?	No.

The following tables are presented at the end of this DUSR and provide summaries of results outside QC criteria:

- Method Blanks Results (Table 2, 2A, and 2B)
- MS/MSD Outside Limits (Table 3 and 3A)
- LCS Outside Limits (Table 4)
- Reanalysis Results (Table 5)
- Field Duplicate Results (Table 6)

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Mercury by EPA Method 1631	
Description	Notes and Qualifiers
Any compounds present in method, trip, or field	Mercury was detected in field blanks 0920FB03
blanks (see Table 2)?	and 0920FB06.
For samples, if results are < 5 times the blank, then "U" flag data (see Tables 2A and 2B).	Dissolved portions of samples 0920MW06GW and 0920MW40GW were less than 5X the blank 0920FB03 detection. The samples should be considered estimated and were already J qualified due to being between the MDL and RL. No additional qualifications were made.
	Dissolved portion of sample 0920MW58GW was less than 5X the blank 0920FB06 detection. The sample result was J qualified as estimated.
Is Laboratory QC frequency at least one blank,	Yes.
standard reference material (SRM) and MS/MSD with each batch?	166.
Is MS/MSD within QC criteria (see Table 3 and 3A)? If out and LCS is compliant, then "J" flag positive data in original sample due to matrix.	Yes.
Is SRM within QC criteria (see Table 4)?	Yes.
Are the initial calibration standards recovered between 90-110?	Yes.
Spot check ICV 85-115%.	The ICVs were acceptable.
Spot check CCV 77-123%.	The CCVs were acceptable.
Spot check ICB/CCB detections.	Yes.
•	Mercury was detected in multiple CCBs below the MDL values. No qualifications were made.
Were any samples reanalyzed or diluted (see Table 5)? For any sample reanalysis or dilutions, is only one reportable result flagged?	Samples 0920MW100GW (2037046-10) and 0920MW100GW (2037046-11) yielded results above the high calibration standard. The laboratory re-analyzed in sequence 2001185 at a higher dilution and the results were reported from sequence.
	Sample 0920MW101GW was re-analyzed due to potential carryover from dissolved and total samples 0920MW100GW. The sample was reanalyzed in sequence 2001185 and the reanalysis confirmed the original result. The reanalysis was reported.
	Sample 0920RD99SW yielded results below the MRL. The sample was reanalyzed and reported detectable results in sequence 2001185 using larger aliquots. The re-analysis was reported.
	The dissolved result for sample 0920MW47GW was higher than the associated total result for sample. Bottles were visually inspected, and labels were checked. The samples were reanalyzed in sequence 2001185 and the results confirmed. The results from original analysis sequence 2001174 was reported.

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Mercury by EPA Method 1631	
Description	Notes and Qualifiers
	Multiple samples were diluted as noted in Table 5 and no justification was given by laboratory in the case narrative. Samples yielding results above the calibration standard is suspected.
Do field duplicate results show good precision for all compounds (see Table 6)?	Yes.

Summary of Potential Impacts on Data Usability		
Conce	erns	
•	Dissolved portion of sample 0920MW58GW was less than 5X the blank 0920FB06 detection.	
	The sample result was J qualified as estimated.	

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Table 2 – List of Positive Results for Blank Samples

Method	Sample ID	Sample Type	Analyte	Result	Qualifier	Units	MDL	PQL
1631E	0920FB03	FB	Mercury	0.18	J	ng/L	0.13	0.40
1631E	0920FB06	FB	Mercury	0.14	J	ng/L	0.13	0.40

Table 2A – List of Samples Qualified for Method Blank ContaminationNone

Table 2B - List of Samples Qualified for Field Blank Contamination

Method	Field Blank	Matrix	Analyte	Blank Result	Sample Result*	Lab Qualifier	PQL	Affected Samples	Sample Flag
1631E	0920FB03	FB	Mercury	0.18	1.76/0.29	J	0.42	0920MW06GW	J Flag
1631E	0920FB03	FB	Mercury	0.18	1290/485		10.2	0920MW100GW	None
1631E	0920FB03	FB	Mercury	0.18	651/503		10.2	0920MW27GW	None
1631E	0920FB03	FB	Mercury	0.18	1220/563		102/10.2	0920MW28GW	None
1631E	0920FB03	FB	Mercury	0.18	2.37/0.26	J	0.41	0920MW40GW	J Flag
1631E	0920FB03	FB	Mercury	0.18	38.1/25.7		10.5/0.42	0920MW55GW	None
1631E	0920FB06	FB	Mercury	0.14	63.4/32.1		2.04	0920MW42GW	None
1631E	0920FB06	FB	Mercury	0.14	7.74/1.12		0.41	0920MW51GW	None
1631E	0920FB06	FB	Mercury	0.14	3.50/ND		0.42	0920MW54GW	None
1631E	0920FB06	FB	Mercury	0.14	15.8/0.59		0.41/0.42	0920MW58GW	J Flag

^{*}The results for total and dissolved mercury are provided under the "Sample Result" column.

Table 3 – List of MS/MSD Recoveries outside Control LimitsNone

Table 3A – List of RPDs outside Control LimitsNone

Table 4 – List of SRM Recoveries outside Control LimitsNone

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Table 5 – Samples that were Re-analyzed

Sample ID	Lab ID	Method	Sample Type	Action
0920MW100GW	2037046-10RE1	1631E (Total)	N	26X: The original analysis yielded sample results that exceeded the highest calibration standard. The sample was re-analyzed at a dilution and the diluted sample results were reported.
0920MW100GW	2037046-11RE1	1631E (Dissolved)	N	26X: The original analysis yielded sample results that exceeded the highest calibration standard. The sample was re-analyzed at a dilution and the diluted sample results were reported.
0920MW101GW	2037046-12RE1	1631E (Total)	N	5X: Sample was re-analyzed due to potential carryover from dissolved and total samples 0920MW100GW. The re-analysis confirmed the initial results.
0920RD99SW	2037046-72RE1	1631E (Total)	N	The sample yielded a value below the reporting limits; therefore, the laboratory reanalyzed the sample and reported detectable results. The re-analysis was reported.
0920MW47GW	2037046-36	1631E (Total)	N	The dissolved result was higher than the associated total result for sample. The sample was reanalyzed, and the results confirmed. The results from original analysis was reported.
0920MW47GW	2037046-37	1631E (Dissolved)	N	The dissolved result was higher than the associated total result for sample. The sample was reanalyzed and the results confirmed. The results from original analysis was reported.
0920MW16GW	2037046-16	1631E (Total)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW16GW	2037046-17	1631E (Dissolved)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW27GW	2037046-20	1631E (Total)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW27GW	2037046-21	1631E (Dissolved)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW28GW	2037046-22	1631E (Total)	N	255X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW28GW	2037046-23	1631E (Dissolved)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW42GW	2037046-26	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW42GW	2037046-27	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW45GW	2037046-32	1631E (Total)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW45GW	2037046-33	1631E (Dissolved)	N	5X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW50GW	2037046-40	1631E (Total)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.
0920MW55GW	2037046-50	1631E	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.

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Sample ID	Lab ID	Lab ID Method Sample Type Action						
		(Total)						
0920RD06SW	2037046-64	1631E (Total)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.				
0920RD08SW	2037046-66	1631E (Total)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.				
0920RD15SW	2037046-70	1631E (Total)	N	26X: Sample was diluted by laboratory. No reasoning discussed in case narrative.				

Table 6 – Summary of Field Duplicate Results

Method	Analyte	Unit	Matrix	PQL	Anal Type	0920MW48GW	0920MW99GW	RPD	RPD Rating	Sample Qual
EPA 1631	Mercury, Total	ng/l	WG	0.41	Α	4.79	4.51	6.0%	Good	None
EPA 1631	Mercury, Dissolved	ng/l	W	0.41	Α	3.07	2.8	9.2%	Good	None

Method	Analyte	Unit	Matrix	PQL	Anal Type	0920MW57GW	0920MW101GW	RPD	RPD Rating	Sample Qual
EPA 1631	Mercury, Total	ng/l	WG	0.41	Α	38.7	40.6	4.8%	Good	None
EPA 1631	Mercury, Dissolved	ng/l	WG	0.41	Α	14.4	15.7	8.6%	Good	None

Method	Analyte	Unit	Matrix	PQL	Anal Type	0920MW28GW	0920MW100GW	RPD	RPD Rating	Sample Qual
EPA 1631	Mercury, Total	ng/l	WG	10.2	Α	1220	1290	5.6%	Good	None
EPA 1631	Mercury, Dissolved	ng/l	WG	10.2	Α	563	485	14.9%	Good	None

Method	Analyte	Unit	Matrix	PQL	Anal Type	0920RD10SW	0920RD99SW	RPD	RPD Rating	Sample Qual
EPA 1631	Mercury, Total	ng/l	SW	0.41	Α	5.25	5.36	2.1%	Good	None
EPA 1631	Mercury, Dissolved	ng/l	SW	0.41	Α	4.22	3.21	27.2%	Good	None

Acronym List and Table Key:

CCB = continuing calibration blank
CCV = continuing calibration verification

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Acronym List and Table Key:

COC = chain of custody

DUSR = data usability summary report

EB = equipment blank

FB = field blank FD = field duplicate

ICB = initial calibration blank ICV = initial calibration verification

LR = laboratory replicate

MB = method blank MS = matrix spike

MSD = matrix spike duplicate

N = normal sample
ND = not detected

QA = quality assurance

QAPP = quality assurance project plan

QC = quality control RB = rinsate blank

RPD = relative percent difference SDG = sample delivery group